

**Lockheed Martin  
Energy Research Corporation**

**FY 1998  
Environment, Safety, and  
Health Management Plan  
for the  
Oak Ridge National  
Laboratory**



**LOCKHEED MARTIN ENERGY  
RESEARCH CORPORATION**

**FY 1998  
ENVIRONMENT, SAFETY, AND HEALTH  
MANAGEMENT PLAN**

**FOR THE**

**OAK RIDGE NATIONAL  
LABORATORY**

**Revision 1**

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**Prepared by  
LOCKHEED MARTIN ENERGY RESEARCH CORPORATION  
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## ACRONYMS AND ABBREVIATIONS

A/E	architect/engineer
ACB	auxiliary charcoal bed
AD	Associate Director
ADS	activity data sheet
ALARA	as low as reasonably achievable
ANS	American Nuclear Society
ANSI	American National Standards Institute, Inc.
ANSI/ANS	American National Standards Institute/American Nuclear Society
ARIM	Accelerator and Reactor Improvement and Modification
ASA	Auditable Safety Analysis
ASE	Accelerator Safety Envelope
ASME	American Society of Mechanical Engineering
ASRC	Accelerator Safety Review Committee
ATLC	Atomic Trades and Labor Council
B&R	Budget and Reporting
BES	Basic Energy Sciences
BIO	Basis of Interim Operations
BMP	best management practice
BNL	Brookhaven National Laboratory
CAA	Clean Air Act of 1970
CASS	Corrective Action Support Staff
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	chlorofluorocarbon
<i>CFR</i>	<i>Code of Federal Regulations</i>
COO	conduct of operations
CRC	Criticality Review Committee
CSO	Cognizant Secretarial Office
CWA	Clean Water Act of 1972
CY	calendar year
D&D	decontamination and decommissioning
dc	direct current
DNFSB	Defense Nuclear Facility Safety Board
DOE	Department of Energy
DOELAP	DOE Laboratory Accreditation Program
DOT	Department of Transportation
DPPR	Development, Planning, and Performance Review
DRC	Director's Review Committee
ECRP	Employee Concerns/Response Program
EM	Environmental Management

EMMIS	Environmental Monitoring Management Information System
EO	Executive Order
EP	environmental protection
EPIC	Environmental Management Program Integrating Contractor
ER	Energy Research
ERPG	Emergency Response Planning Guidelines
ES&H	environment, safety, and health
ESH&Q	environment, safety, health, and quality
ESHQC	Environment, Safety, Health, and Quality Committee
ETTP	East Tennessee Technology Park
FAB	Facility Authorization Basis
FFA	Federal Facilities Agreement
FMP	Facility Management Program
FOCI	foreign ownership, control, and influence
FPE	Fire Protection Engineering
FPPCC	Fire Protection Program Coordination Committee
FRAM	Functions, Responsibilities, and Authority Manual
FS	Facility Safety
FSAR	Final Safety Analysis Report
FSP	Facility Safety Program
FWP	Field Work Proposal
FY	fiscal year
GPE	general-purpose equipment
GPP	general plant project
GSAF	generator set-aside fund
H&S	health and safety
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEU	highly enriched uranium
HFIR	High Flux Isotope Reactor
HIFC	Hazard Identification and Facility Classification
HMIS	Hazardous Materials Inventory System
HSA	Health Studies Agreement
HVAC	heating, ventilating, and air-conditioning
I&C	Instrumentation and Controls
IMP	Infrastructure Management Plan
IMS	Issues Management System
IPD	Integrated Process Demonstration
ISMS	Integrated Safety Management System
kV	kilovolt
LAP	Laboratory Assessment Program
LCAM	Life Cycle Asset Management
LCD	limiting conditions document
LI	line item
LIDS	Laboratory Issues Database System
LLLW	liquid low-level waste
LMER	Lockheed Martin Energy Research Corporation

LMES	Lockheed Martin Energy Systems, Inc.
LOI	lines of inquiry
LQPT	Land Quality Protection Team
LSS	Laboratory Shift Superintendent
M&I	management and integration
MBA	Materials Balance Area
MSRE	Molten Salt Reactor Experiment
N&S	necessary and sufficient
NCS	nuclear criticality safety
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMC&A	Nuclear Materials Control and Accountability
NPDES	National Pollutant Discharge Elimination System
OE	Operating Expense
OEP	Office of Environmental Protection
OESH	Operations, Environment, Safety, and Health
OLP	Office of Laboratory Protection
ONS	Office of Nuclear Safety
OQS	Office of Quality Services
OREIS	Oak Ridge Operations Office Environmental Information System
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations Office (DOE)
ORP	Office of Radiation Protection
ORPS	Occurrence Reporting and Processing System
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OSHP	Office of Safety and Health Protection
OSO	ORNL Site Office
OSR	Operational Safety Requirements
P&E	Plant and Equipment
P2	pollution prevention
PA	public address
PAAA	Price-Anderson Amendments Act
PAG	<i>Protection Action Guide</i>
PCBs	polychlorinated biphenyls
PHS	Preliminary Hazard Screening
PM	preventive maintenance
PMTS	Program Management Tracking System
PPR	Pollution Prevention Representative
PSAR	Preliminary Safety Analysis Report
Pu	plutonium
QA	quality assurance
QAC	Quality Assurance Coordinator
QAS	Quality Assurance Specialist
QC	quality control

QE&I	Quality Engineering and Inspection
R&D	research and development
RA	Readiness Assessment
RAC	Risk Assessment Code
RCRA	Resource Conservation and Recovery Act
REDC	Radiochemical Engineering Development Center
RERC	Reactor Experiments Review Committee
RORC	Reactor Operations Review Committee
RPM	Risk-Based Priority Model
RRC	Reactor Review Committee
RRD	Research Reactors Division
S&H	safety and health
SAD	Safety Assessment Document
SAR	Safety Analysis Report
SARUP	Safety Analysis Reports Update Program
scfm	standard cubic feet per minute
SEN	Secretary of Energy Notice
SER	Safety Evaluation Report
SES	Supplier Evaluation Services
SHEST	Safety and Health Evaluation and Support Team
SISMP	Site Integrated Stabilization Management Plan
SME	subject matter expert
SNF	spent nuclear fuel
SQIG	Supplier Quality Information Group
S/RID	Standards/Requirements Identification Document
SSA	System Safety Analysis
TAG	Technical Audit Group
TIO	Training Integration Office
TOA	Tennessee Oversight Agreement
TSC	Transportation Safety Committee
TSCA	Toxic Substances Control Act of 1976
TSR	Technical Safety Requirements
UNICALL	Unified Field Budget Call
USI	unreviewed safety issue
USQD	Unreviewed Safety Question Determination
UST	underground storage tank
VPP	Voluntary Protection Program
WAC	Waste Acceptance Criteria
WMRAD	Waste Management and Remedial Action Division
WMS	work management system
WSSs	Work Smart Standards
WWW	World Wide Web

## **ORNL ENVIRONMENT, SAFETY, AND HEALTH GOAL STATEMENT**

Oak Ridge National Laboratory (ORNL) is committed to excellence in all activities and to cost-effective operation in compliance with all applicable environment, safety, and health (ES&H) laws and regulations. This commitment is reflected in the Laboratory's mission statement and in the *ORNL R&D Strategic Plan*, which identifies the goal of conducting all operations in a safe and environmentally responsible manner.

The management contract between the Department of Energy (DOE) and Lockheed Martin Energy Research Corporation (LMER) establishes the fundamental ES&H expectations of DOE. The Laboratory has established Level 1 and Level 2 measures of performance to help achieve the ES&H goals defined in the *DOE Strategic Plan*. Funding of ES&H for full compliance continues to be a challenge to Laboratory management, who will work within the constraints of decreasing budgets and use risk-based prioritization of activities as a basis for planning and budgeting.



## EXECUTIVE SUMMARY

The Lockheed Martin Energy Research Corporation (LMER) Environment, Safety, and Health (ES&H) Management Plan was developed to describe the approach used at the Oak Ridge National Laboratory (ORNL) to ensure the health and safety of employees and the public, protect the environment, and comply with requirements set forth in the Work Smart Standards (WSSs) agreed upon by LMER and the Department of Energy (DOE). This plan documents the systems and processes used by ORNL to (1) establish and communicate ES&H expectations and requirements to the ORNL community, (2) identify and secure funding for ES&H activities using risk-based planning and priority setting, (3) conduct research and development (R&D) activities and operations through integration of ES&H principles in work planning and execution, and (4) assess ES&H performance and provide feedback to promote continuous improvement. The plan was prepared in accordance with guidelines in the *DOE Guidance Manual for the ES&H Planning Process for Fiscal Year (FY) 1999*, and its issuance satisfies the requirement in the DOE-LMER Management Contract, I.71 DEAR 970.5204-2 Paragraph C.

The mission of ORNL is to conduct basic and applied R&D to advance the nation's energy resources, environmental quality, scientific knowledge, educational foundations, and national economic competitiveness. This mission is accomplished with a commitment to excellence in all activities and to cost-effective operation in compliance with applicable ES&H laws and regulations. The diversity of R&D and its support activities creates challenges as well as opportunities for ORNL in the effort to apply ES&H goals and objectives in a manner that supports ORNL's mission and adds value to operational performance.

Achieving excellence in ES&H is accomplished through effective interaction between the line organization and the ES&H staff, with employee involvement at all levels. Line management is responsible for fully implementing ES&H requirements within their organizations by (1) developing systems and approaches that result in the effective management of ES&H risks and (2) creating a culture that effectively integrates employee and environmental protection into work planning, execution of work activities, and performance assessment and feedback. The ES&H staff supports the line organization by providing specialized technical assistance and guidance, interfacing with DOE and external regulators, and providing program oversight necessary to assure effective integration of ES&H management systems into all research and operations activities.

During FY 1997, ORNL and DOE continued a pilot program to reduce ES&H oversight costs to DOE and ORNL while maintaining or improving ES&H performance. The Laboratory used a performance-based management system for the pilot program, and performance measures to assess ORNL's ES&H program were jointly developed by ORNL ES&H staff and DOE personnel to drive performance improvement. The performance measures include criteria which are objectively measurable and allow for meaningful trends.

Beginning with the FY 2000 ES&H Budget Formulation Submission, an ORNL Issues Management System will be developed and implemented to assure that potentially significant issues are recognized. Section 7.6 of the plan is an effort to identify those issues which will be evaluated for inclusion in the Issues Management System. Elements of the Issues Management System will include issues identification, documentation and communication, establishment of resolution strategy, monitoring of progress, and verification of resolution.

ORNL has a strong base on which to continue development of the ES&H programs as well as the technical resources vital to program development. Factors that will aid in addressing future challenges include a renewed commitment by ORNL to foster line management accountability for ES&H and to take greater advantage of untapped human resources. The continued effort to involve ORNL employees effectively is a key component of future ES&H program development.

## **1. INTRODUCTION**

Oak Ridge National Laboratory (ORNL) is managed by Lockheed Martin Energy Research Corporation (LMER) for the Department of Energy (DOE) under Contract DE-AC05-96OR22464. As part of the Management Contract, ORNL has agreed to submit to DOE an Environment, Safety, and Health (ES&H) Management Plan. Issuance of this management plan satisfies the ORNL commitment stipulated in the Management Contract (Section I.71 DEAR 970.5204-2, Paragraph C).

This plan documents the systems and processes used by ORNL to (1) establish and communicate ES&H expectations and requirements to the ORNL population, (2) identify and secure funding for ES&H activities using risk-based planning and priority setting, (3) conduct research and development (R&D) activities through integration of ES&H principles into work planning and execution, and (4) assess ES&H performance and provide meaningful feedback to promote performance improvement. Implementation of the systems and processes described in this document provides the basis by which ORNL ensures the health and safety (H&S) of employees and the public, protects the environment, and complies with the Work Smart Standards (WSSs) agreed to by DOE and ORNL.

## **2. ES&H MISSION AND PROGRAM APPROACH**

The ES&H mission of ORNL is to conduct R&D and operations in a manner that protects the environment, staff, and public, while allowing ORNL to continue to carry out world-class research in a cost-effective, competitive manner.

ORNL is committed to the advancement of science and technology while addressing important national and global energy and environmental issues. As DOE's largest multi-program, nonweapons laboratory, ORNL employs approximately 4400 staff members and annually hosts approximately 3500 guest researchers from universities and industry. The mission of ORNL is to conduct basic and applied R&D to advance the nation's energy resources, environmental quality, scientific knowledge, educational foundations, and national economic competitiveness. This mission is accomplished with a commitment to excellence in all activities and to cost-effective operation in compliance with applicable ES&H laws and regulations. The diversity of R&D and its support activities creates challenges as well as opportunities for ORNL in the effort to apply ES&H goals and objectives in a manner that supports ORNL's mission and adds value to operational performance. The ORNL approach to achieving DOE strategic goals for ES&H is discussed in Section 6.6 of this plan.

### 3. ORGANIZATIONAL DESCRIPTION

#### 3.1 ORNL ORGANIZATIONAL STRUCTURE

The Associate Director (AD) of Operations, Environment, Safety, and Health (OESH) is one of six ADs who report to the ORNL Director (Appendix A). The OESH AD is responsible for identifying the ES&H requirements applicable to ORNL research and operations and for maintaining programs to assure that those requirements are met. This organization includes offices that administer the following:

- comprehensive environment, safety, health, and quality (ESH&Q) guidance in the areas of radiation protection, industrial safety, industrial hygiene, criticality safety, operational readiness, facility safety, emergency preparedness, fire protection engineering, environmental compliance, and quality assurance;
- laboratory protection for emergency planning, emergency preparedness, off-shift operations, and fire protection engineering;
- ES&H technical training integration;
- medical services and maintenance support;
- engineering and construction management;
- newly generated waste management programs; and
- operations support provided by Lockheed Martin Energy Systems, Inc. (LMES) in the areas of environmental restoration, legacy waste management, fire protection, and plant security.

Industrial hygiene, industrial safety, radiation protection, environmental compliance, facility safety, criticality safety, and quality assurance specialists from the Office of Safety and Health Protection (OSHP), the Office of Radiation Protection (ORP), the Office of Environmental Protection (OEP), the Office of Nuclear Safety (ONS), and the Office of Quality Services (OQS) support specific R&D and operations divisions. The divisions also select line personnel to serve as the division's environmental protection, radiation control, and safety officers.

The ORNL ES&H organizational structure is shown in Appendix A. Comprehensive descriptions of the ESH&Q program offices are presented in Appendix B.

### **3.2 KEY ROLES AND RESPONSIBILITIES FOR ES&H**

ORNL line management is responsible for the daily operation of their respective organizations and for ensuring that research and operational activities are conducted in a manner that is protective of human health and the environment.

The primary role of the ORNL ES&H organizations is to provide technical guidance and support to the line organizations. This role is accomplished by (1) preparing environmental protection, safety, and health directives; (2) providing specialized technical assistance and guidance; (3) providing a single point of contact for environmental regulatory interface; (4) conducting ES&H surveillance activities; (5) negotiating site-wide and facility-specific environmental permits and agreements; (6) providing environmental, industrial hygiene, and health physics monitoring, sampling, reporting, and record keeping; (7) maintaining comprehensive ORNL-wide ES&H programs; (8) providing ES&H training integration management; and (9) conducting ES&H resource planning and prioritization. Additionally, the ES&H staff assists the line organizations in determining the applicability of new or revised ES&H requirements, developing strategies to meet those requirements, and supporting implementation of the strategies.

The Environment, Safety, Health, and Quality Committee (ESHQC) is composed of representatives from ORNL's directorates. The ESHQC approves implementation strategies for new ES&H requirements, recommends resource allocations for special ES&H activities, reviews ES&H performance by line organizations, and provides a mechanism for the ES&H disciplines and personnel in the field to bring concerns to the attention of upper management. To ensure that overall ES&H goals are being addressed by the research divisions at all levels and to share lessons learned among organizations, the research ADs annually review each division's ES&H goals and objectives with the ESHQC.

Various levels of ORNL management (e.g., ADs, division directors, program managers, and department heads) review the results of internal assessments conducted by line and ES&H organizations as well as findings from corporate audits, DOE appraisals, and other evaluations conducted by external organizations. ORNL has an internal self-assessment program, the Laboratory Assessment Program (LAP), to review and validate the divisional self-assessment programs and compliance status. This internal program is described in Section 5.

### **3.3 ES&H OWNERSHIP BY LINE MANAGEMENT**

ORNL's goal is to minimize the oversight responsibilities of ES&H organizations and to hold line management accountable for their activities and actions. ES&H staff organizations support line management by providing guidance and technical assistance. ES&H staff provide regulatory interpretation, guidance, and support to ensure that ES&H goals are actively pursued while minimizing adverse impacts to the line organizations. However, it remains line management's direct responsibility to incorporate compliance with ES&H policies and requirements into each organization's research and operational activities. Line management is responsible for fully implementing ES&H policies and requirements. This is accomplished

by (1) implementing systems and approaches that result in the effective management of safety, health, and environmental risks and (2) creating a culture that effectively integrates employee protection into work planning and execution of work activities.

### **3.4 ACCOUNTABILITY FOR ES&H PERFORMANCE**

Compliance with ES&H policies and requirements is the responsibility of each employee at ORNL. Individual staff members and managers of each research and operation line organization are responsible and accountable for understanding and meeting the ES&H requirements associated with their activities and operations.

The ORNL Development, Planning, and Performance Review (DPPR) process states that an annual performance plan must be developed for each salaried employee and supervisor position. Performance to completion of goals and objectives is a significant factor in each employee's DPPR overall performance rating. The annual performance evaluation of all salaried employees includes an evaluation of performance factors, one of which is specifically ES&H performance.

The ORNL Positive Discipline Program is also utilized to reinforce accountability for ES&H compliance. Positive Discipline Guidelines have been developed and issued for use in cases involving noncompliance with ES&H requirements. These guidelines state that disciplinary action will be taken when the conduct of a manager, supervisor, or worker is inconsistent with established policies, procedures, rules of conduct, prescribed performance standards, environmental protection requirements, or occupational safety and health regulations. The objectives of positive discipline are to achieve correction, where applicable, and to provide constructive direction to ensure future compliance.

### **3.5 COMMUNICATION OF ES&H EXPECTATIONS**

DOE ES&H expectations for ORNL are contained in the DOE-LMER Management Contract. In support of these expectations, DOE and ORNL ES&H management and staff interface regularly in both formal and informal meetings to ensure that specific ES&H goals and objectives are being met. Development of the ES&H Oversight Reduction Program effort (Section 5.7) helped to strengthen the working relationship and communication between DOE and ORNL.

Within the contract, ORNL has committed to improve the ES&H program and has accepted specific responsibilities. The following commitments support integration of the ES&H program within research and operational activities:

- As specified in the *Oversight Responsibility* clause of the contract (Section H.14), ORNL has oversight responsibility for health, safety, and environmental law compliance for ORNL and the National Environmental Research Park of the Oak Ridge Reservation.
- As specified in the *Contractor Commitments* portion of the contract (Section H.20), ORNL has committed to achieving significant progress towards DOE Voluntary

Protection Program (VPP) "STAR" status by 1998. In support of this, ORNL moved ahead with the Work Smart (Necessary and Sufficient) Standards implementation and the reengineering of ES&H. These two initiatives will better position ORNL to achieve VPP "STAR" status.

- As specified in the *Clean Air and Water* clause of the contract (Section I.35), ORNL has agreed to comply with all the requirements of the Clean Air Act and Clean Water Act (Appendix C). In addition to complying with the requirements set forth in the *Clean Air and Water* clause, ORNL complies with 19 other identified environmental laws and their applicable regulations (Section I.101). ORNL will also assist DOE in compliance with other specified laws and executive orders such as the National Environmental Policy Act (NEPA) and the Endangered Species Act (Appendix C).
- Section H.15(c) of the DOE Directives provides two methods for establishing ES&H contract requirements: (1) Standards/Requirements Identification Documents (S/RIDs) and (2) WSSs as approved by DOE and LMER. When the contract became effective January 1, 1996, LMER was operating under S/RIDs; LMER later elected to exercise the option to develop WSSs.

Communication is an essential element for establishing an internal culture sensitive to ES&H objectives. A critical prerequisite for performing the work necessary to accomplish organizational goals is ensuring that all employees understand and execute their roles and responsibilities in accordance with the WSSs. ORNL uses a variety of tools to communicate ES&H requirements, goals, and objectives to ORNL personnel. For example, depending on the information to be communicated, ORNL management may use Immediate Action Directives, bulletins, seminars, letters, or announcements on *ORNL Today*. These communications may be directed to all ORNL employees or specifically to division directors, who are then expected to communicate the information to affected individuals within their organizations. Line management communicates ES&H requirements, roles, and responsibilities in formal and informal training, staff meetings, safety meetings, work directives, and day-to-day interactions with work group members.

ORNL ES&H staff organizations interface with DOE and external regulators for guidance when interpreting the ES&H requirements stipulated in the WSSs in the DOE-LMER Management Contract. New ES&H policies and requirements and proposed implementation strategies are presented to the ESHQC as necessary to maintain compliance. The ESHQC interfaces with the R&D and ES&H organizations to evaluate new ES&H policies, requirements, and implementation strategies to determine the impact on research and operations. The ESHQC approves or recommends changes to the implementation strategies. Information from these interfaces is communicated to employees so that requirements can be incorporated into their work. ES&H subject matter experts (SMEs) are also available to assist R&D organizations in reviewing projects for ES&H requirements and developing a strategy to ensure that those requirements are met.

### **3.6 ORNL STRATEGIC PLANNING**

Throughout its existence as a national laboratory, ORNL has conducted strategic planning to prepare for new challenges, focus its resources on the future, and explore new technical directions. The strategic planning process recognizes that the incorporation of ES&H into research and operational activities is inherent in performing ORNL's mission successfully and achieving its goals and objectives. The critical success factors of the *DOE Strategic Plan*—ES&H, management practices, human resources, and communication and trust—provide the basis for the ORNL goals that address conduct of operations. Appendix D contains an excerpt from the *ORNL R&D Strategic Plan*, which is currently in revision.

## **4. ES&H RISK MANAGEMENT**

### **4.1 FORMAL HAZARD IDENTIFICATION AND FACILITY CLASSIFICATION**

Hazard identification and facility classification are determined by the type of process, operation, or amount of hazardous material inventory used, stored, or processed in ORNL facilities. Guidance and criteria for identifying hazards and determining a facility's hazard classification have been adopted from the LMES *Hazard Identification and Facility Classification Application Guide* (ES/CSET-2) by LMER for use at ORNL.

#### **4.1.1 Facility Hazard Identification**

The ORNL hazard identification process identifies hazards requiring further evaluation and determines a facility's hazard category. The process evaluates a facility's operations against established screening criteria to identify unique hazards that may require more detailed hazard analysis. This hazard evaluation is documented on a Preliminary Hazard Screening (PHS) Worksheet. If the process identifies occupational hazards that are adequately controlled using established industrial hygiene and safety programs, the facility is classified as an "Other Industrial" facility, and no further safety analysis is required. Unique hazards typically identified at ORNL through this process include the following:

- Radiological hazards associated with ionizing radiation,
- Nonradiological hazards associated with dangerous properties of materials, and
- Nonradiological hazards associated with energy sources.

These hazards require additional evaluation beyond the PHS.

#### **4.1.2 Facility Hazard Classification**

Facility hazard classification beyond the "Other Industrial" classification utilizes an inventory-based approach for radiological materials and utilizes both the inventory-based and consequence-based methods for nonradiological hazards. The radiological and non-radiological (hazardous) material inventory is compared to criteria established by DOE. The inventory-based approach does not require a quantitative determination of the probability of

events resulting in the release and dispersion of radiological or nonradiological hazardous materials. Nonradiological materials and other hazardous sources that do exceed the criteria must be evaluated further using consequence-based analyses.

Determining the facility hazard classification may require evaluation beyond comparison of the material inventory against the specified criteria. The use of both inventory-based and consequence-based methods are appropriate when facility segmentation is possible, if the material present is in an unusual form, or if it is desirable to know the magnitude of the material at risk. Modifying the bases for hazard classification includes adjusting the threshold quantities for a different release fraction, taking credit for segmentation, or applying a “reasonableness test” based on experience. The latter is generally used for modifying consequence-based classification.

Facilities are designated as nuclear hazard Category 2, Category 3, or Radiological based on the inventory of radioactive material used or stored in a facility. A Category 1 nuclear facility will be designated as such by DOE. Nonradiological hazardous facilities are classified as High, Moderate, or Low. Facility hazard classifications used at ORNL are defined in Table E.1 of Appendix E.

## **4.2 HAZARD CONTROLS/FACILITY AUTHORIZATION BASIS DOCUMENTATION**

Facility Safety and Facility Authorization Basis (FAB) documents are used to formally document facility hazard classification and accident analyses at ORNL. These documents establish the necessary considerations for maintaining the safety of a facility and associated facility operation without causing undue risk to employees, the public, or the environment.

The appropriate level of documentation required to address a facility is determined by the hazard present. Facilities categorized as “Other Industrial” have the simplest level of documentation. As the level of the hazard increases so will the level of documentation. A graded approach is applied in determining what levels of conditions are necessary for developing the safety basis for operating a facility. LMER Procedure FS-2.0, “Facility Authorization Basis Documentation,” establishes the requirements and provides guidance for establishing the documentation required to address issues that are important to the safety of facility operations. The greater the hazard(s) at a facility the more detailed the analysis. A complete list of the various types of Facility Safety and FAB documents at ORNL is provided in Table E.2 in Appendix E. Each document listed contains a description, a basis for the existence of the document, and guidance as to when preparation of a document is required.

Each facility is initially evaluated with a PHS and, based on the level of hazard, additional levels of evaluation may be required. The PHS and other lower-tier documents are reviewed periodically to ensure that the documents are kept current. The level of documentation necessary for higher hazard facilities is based upon the following requirements:

- FAB documentation for all nuclear hazard Category 1, 2, and 3 facilities complies with DOE Order 5480.21, *Unreviewed Safety Questions*, DOE Order 5480.22, *Technical Safety Requirements*, and DOE Order 5480.23, *Nuclear Safety Analysis Reports*.
- Facility safety documentation for all nonnuclear hazardous facilities complies with the requirements as defined by contract requirements.
- FAB documentation for Environmental Management managed facilities that are designated “Radiological” must meet the requirements for DOE-EM-STD-5502-94.
- FAB documentation for all nuclear and nonnuclear hazardous facilities is to be reviewed and updated annually.
- Revisions to FAB documentation are required when there are modifications to the facility, inventory, operating safety envelope, or operating conditions and also for nuclear facilities, which must be documented in accordance with DOE Order 5480.21.

### **4.3 INTERNAL HAZARDS IDENTIFICATION AND CONTROL PROGRAMS**

In addition to the formal hazards identification and analysis program required by ES/CSET-2 (Section 4.1), ORNL has institutionalized several programs to assure that processes are in place for employees to report or to respond to potential or actual occurrences that may impact the safety and health of employees, the public, and the environment. Following are descriptions of the primary programs at ORNL:

#### **4.3.1 Employee Concerns/Response Program**

The Employee Concerns/Response Program (ECRP) (formerly ORNL's Safety Suggestion Program) provides a process for individuals to report environmental, health, and other employee concerns to appropriate management. Individuals are encouraged to document their concerns on UCN 19937, "Employee Concerns/Response Program" form. The Division Support Section of OSHP is responsible for the entry, evaluation, tracking, follow-up, and closure of those employee concerns which cannot be handled through conventional means at the supervisor's level. Timely assessment of the cited concern(s) and feedback to the originator are key program objectives. In addition, DOE provides the "Employee Concerns Reporting Form" for DOE federal and contractor employees to help identify and resolve concerns relating to DOE programs.

#### **4.3.2 Accident/Incident Investigation Program**

The need for investigating undesirable events evolves from near-misses; minor injuries; accidents involving serious injury, exposure, or property damage; or isolated incidents representing unusual circumstances. The thoroughness of these investigations ranges from a preliminary inquiry up to the issuance of a formal report by a board appointed by site

management. Program elements are in place within the ES&H disciplines to adequately address each of these events, with the objective of ultimately clearly identifying root cause, enabling corrective action, and effectively communicating lessons learned (internally and externally). An additional, externally driven contributor to these program elements is the Occurrence Reporting System, which requires similar investigation approaches and necessitates resolution of identified deficiencies.

### **4.3.3 Occurrence Reporting**

ORNL has an occurrence reporting program implemented through ORNL procedure ORNL-OR-001, "ORNL Occurrence Notification and Reporting." The Occurrence Reporting Program serves three primary functions: (1) it informs DOE and other stakeholders of reportable events occurring at the ORNL Site; (2) it helps ORNL find, fix, and prevent recurrence of problems through effective causal analysis, corrective actions, and trending; and (3) it provides a vehicle for the sharing of lessons learned among DOE contractor organizations. The program includes requirements for timely identification, categorization, notification, evaluation, correction, and reporting of occurrences to management and to DOE. It also identifies the requirements and assigns responsibilities for initial off-site notifications for emergencies and other reportable occurrences.

The ORNL Site is divided into separate reporting facility codes. For each, a designated facility manager is responsible for ensuring the entry of occurrence reports into a tracking system and subsequent transmission to the DOE Occurrence Reporting and Processing System (ORPS). Occurrences involving subcontractors, vendor service personnel, or visitors are the responsibility of the contracting or host organization. Organizations supporting or located at multiple sites are responsible for reporting their own occurrences in accordance with the requirements of procedure ORNL-OR-001.

Occurrence notifications to DOE Headquarters and external agencies are conducted by the Laboratory Shift Superintendents, the Facility Managers, and subject matter experts, as appropriate. Overall occurrence program administration and monitoring activities are performed by an Occurrence Reporting Group organizationally assigned to OQS. The Occurrence Reporting Group is also responsible for the dissemination of policy and associated guidance.

### **4.3.4 Lessons Learned and Alerts Program**

ORNL's Lessons Learned and Alerts Program satisfies DOE guidance for sharing useful information to improve operations. ORNL's program is implemented using ORNL Directive QA-16.3, "ORNL Lessons Learned and Alerts Program." The intent of the program is to identify and disseminate both positive and negative operating experience (Lessons Learned and Alerts) which may be applicable to other ORNL organizations to reduce risk, improve efficiency, and enhance the cost effectiveness of ORNL processes and operations.

In support of this program, a Lessons Learned Program Manager in OQS obtains information on issues, problems, and good practices from ORNL organizations, other DOE facilities,

other federal agencies, and industries. The Lessons Learned Program Manager coordinates review of the lessons learned information by subject matter experts for applicability and significance at ORNL. The information is classified as one of four alerts: red (urgent), yellow (caution), blue (information), or green (good work practice). The program specifies the recommended and mandatory actions to be taken in response to Green, Yellow, and Red Alerts. Alerts are then distributed to appropriate personnel so the information can be incorporated into routine activities (e.g., training, safety meetings, project planning, and work processes).

It is the responsibility of ORNL division managers to (1) assure Lessons Learned and Alerts are validated before any action is taken; (2) designate individuals to coordinate organizational alert responses, as needed; and (3) maintain awareness of operational incidents external to ORNL by monitoring bulletins and publications and developing Lessons Learned on experiences potentially applicable to ORNL operations. Division managers are also responsible for ensuring that employees originate Lessons Learned and Alerts for submission to the Lessons Learned Program Manager and inclusion in the program, as appropriate. These may originate from information on issues and problems entered into the Occurrence Reporting System or information developed from the Maintenance Program, the Conduct of Operations Program, the Issues Management Program, trend analysis activities, and the review of external operating experience and other information sources.

#### **4.4 WORK SMART STANDARDS**

Most of the activities conducted at ORNL have direct analogs in private industry and academia, and the hazards posed by those activities are similar. Therefore, the set of appropriate work standards is not unique to ORNL and is shared by most industries. These standards reflect the same laws, regulations, and other requirements that private industry and academia are implementing to protect the public, their employees, and the environment.

An Identification Team, consisting of an ORNL R&D division director and staff, DOE line and ES&H personnel, ORNL support and operations staff, and a member of the Atomic Trades and Labor Council (ATLC), was chartered to identify and propose for confirmation the standards referred to as Work Smart Standards appropriate for activities at ORNL with industrial or academic counterparts. Team members, representing a cross section of activities at ORNL and DOE, were identified and trained in the Necessary and Sufficient (N&S) closure process. Work Smart Standards are identified under the N&S closure process, which at ORNL is based on the process defined in Chapters I and II of the *Department of Energy Closure Process for Necessary and Sufficient Sets of Standards* (DOE M 450.3-1).

The N&S Identification Team used the ORNL facility classifications which, as discussed in Section 4.1, are based on a Laboratory-wide approach to classifying facilities by hazard category. An analysis of the hazards associated with the facilities at ORNL, using the approach of DOE Order 5480.23, *Nuclear Safety Analysis Reports*, and the criteria contained in the *DOE Standard for Hazard Categorization and Accident Analysis Techniques* (DOE-STD-1027-92), was conducted in 1993. The processes identified in these directives provide

a useful, uniform baseline for identifying facility hazards. Facility categories determined from this process were reviewed and approved by ORNL senior management.

To identify WSSs appropriate for ORNL facilities, the activities conducted in these facilities were assessed, and the hazards associated with the activities were identified. A preliminary hazards list was distributed to all ORNL organizations. The hazards identified in prior hazard analyses were contained in the list, and a category of “other” was provided in each general hazard area. A workshop was held to assist organizations in properly completing the list. Completed hazard screening lists were compiled for each ORNL division, and a master list was compiled for all facilities and activities. To ensure completeness, the master list was compared against the results of prior hazard analyses by R&D and ES&H personnel.

Focus Groups, led by members of the Identification Team and staffed by SMEs from ORNL R&D and support organizations and DOE, were formed to evaluate specific hazard areas and recommend appropriate standards. Focus Group members were trained in the N&S closure process by the ORNL Process Leader, and routine meetings were held to exchange information between Focus Groups and with the Identification Team members. Focus Groups evaluated Safety and Health, Environmental Protection, Emergency Management, Incident Reporting, and Radiation Protection. Where appropriate, additional SMEs from ORNL and/or DOE were given the task of evaluating specific activities or hazards and recommending appropriate standards. Following evaluation of the activities and hazards included in the Other Industrial, Radiological, and Nonradiological Hazard Facilities, the standards necessary to comply with legal requirements and sufficient to address the hazards of the activity were identified and documented. Each Focus Group used the following process to identify WSSs:

- Review hazards and issues and select those applicable to the Focus Group responsibility.
- Identify the necessary standards (laws, regulations, etc.) applicable to each hazard or issue.
- Determine if compliance with the necessary standards provides ES&H protection equivalent to industrial facilities.
- If necessary, identify additional internal standards needed for sufficiency.
- Determine level of ES&H protection based on compliance with external sufficient standards.
- If necessary, identify additional internal standards needed for sufficiency.
- Identify implementation issues.
- Document details of the process and results.
- Confirm the standards by an independent team.

The WSSs are based on the hazards associated with operations and activities at ORNL facilities. The elements of the process described below, and the rigor with which this process was implemented, provided the confidence that the set of standards is both complete and adequate.

The Identification Team believes the work scope and hazards for ORNL facilities were thoroughly defined. An extensive hazards identification process was employed as follows:

- A preliminary list of hazards and ES&H issues was developed by ORNL ES&H SMEs and representatives of operations and R&D divisions based on the work and activities conducted in ORNL facilities.
- ORNL divisions/offices were surveyed using the preliminary list to ensure that every hazard or ES&H issue associated with its work was included.
- ORNL's ONS, which has primary responsibility for management and implementation of the facility-by-facility hazard screening process, reviewed the list of hazards and issues to verify that the list included all hazards used to classify the facilities as Other Industrial, Radiological, or Nonradiological Hazard Facilities.

These efforts resulted in the list of hazards evaluated by the Identification Team based on their experience and knowledge of ORNL's work in Other Industrial and Radiological Facilities. The Identification Team used the hazard list to ensure that every identified hazard/ES&H issue was considered from an N&S perspective during the identification phase of this effort.

The standards developed for ORNL facilities are referenced in the DOE-LMER contract, Section H.15(c). All ORNL facilities except the High Flux Isotope Reactor (HFIR) have approved WSSs created under the N&S process. It is anticipated that the HFIR will have an approved set of standards by October 1, 1998.

#### **4.5 RESOURCE PLANNING, PRIORITIZATION, AND ALLOCATION**

The ORNL ES&H management planning process is supportive of DOE's annual ES&H budget formulation and management planning process. The budget is prepared consistent with guidance provided in the DOE *ES&H Management Plan Guidance Manual*, which is produced annually, and with the guidance for providing ES&H budget planning information incorporated annually in the DOE Controller's Unified Field Budget Call (UNICALL).

The ORNL ES&H budget formulation and management planning process provides the planning structure and tools needed to help identify and prioritize ES&H needs, make and communicate cost-effective ES&H risk-management decisions, integrate ES&H into all activities and operations, and establish accountability for ES&H performance. ES&H resource planning and prioritization are implemented in a manner consistent with guidance from DOE, as provided in the *ES&H Management Plan Guidance Manual*, the Office of Environmental Management Budget Formulation Guidance, and any supplemental guidance received from

individual DOE program offices.

The process generally consists of the following steps:

- ES&H needs assessment,
- activity data sheet (ADS) preparation,
- risk-based prioritization of activities and risk-management decision making, and
- ES&H budget formulation and development of top-level ES&H budget summaries (annually).

#### **4.5.1 ES&H Needs Assessment**

ES&H needs assessments are performed by ORNL organizations and line management to identify the activities, systems, and programs needed to ensure the effective management of safety, health, and environmental risks and to create a culture within ORNL that effectively integrates employee protection into work planning and the execution of work activities. These assessments are an ongoing and integral part of ORNL work and mission activities and include identification of risks associated with implementing planned mission activities, applicable ES&H policies and standards, emerging or strategic ES&H issues, and top-level ES&H performance expectations. In response to identified ES&H needs, line organizations and ES&H oversight and support organizations identify cost-effective ES&H programs and activities to address the existing and anticipated risks, achieve performance expectations, and comply with applicable policies and standards.

#### **4.5.2 Activity Data Sheet Preparation**

ES&H ADSs contain the essential scope, schedule, cost, and management information necessary for ORNL organizations to support ES&H planning and provide input to the budgeting process. ADSs are prepared for all ES&H programs and activities needed to operate ORNL in a manner that protects the employees, the public, and the environment and meets those requirements set forth in the WSSs agreed upon by LMER and DOE.

ADSs are prepared to document those programs and activities selected to address the identified ES&H needs. Each ADS contains key information such as a description of the activity; major milestones and deliverables; estimated costs, funding source, and types of funds associated with the activity; and the risk/benefit score for the activity. ADSs are packaged at a level consistent with the manner in which ES&H programs and activities are organized and managed. They correspond to decision units in the overall planning and budgeting processes for ORNL.

#### **4.5.3 Risk-Based Activity Prioritization**

DOE's ES&H Risk-Based Priority Model (RPM) will be used to perform risk evaluations of

all ES&H, infrastructure, and overhead ADSs. Using the RPM, a risk-reduction benefit score is derived for each ADS, and ADS scores are used to establish preliminary priority lists that are reviewed by senior management. Priority adjustments are made as necessary in consideration of additional planning factors.

Risk-based prioritization of ES&H activities supports ORNL's ability to allocate resources to the projects or activities that will produce the maximum feasible benefits to the organization. Risk prioritization is the basis for work planning and scheduling decisions for overhead funded activities at ORNL and is used in conjunction with other planning considerations, such as resource constraints. Where available resources do not allow full and immediate implementation of all proposed ES&H programs and activities, risk-based prioritization provides the mechanism for the allocation of resources.

#### **4.5.4 Resource Allocation**

ADSs are produced for all direct-funded ES&H activities, both target and unfunded, and reflect projected out-year funding for target as well as unfunded activities. ADSs are also produced for all indirect funded (e.g., overhead) activities for which funding has been requested. The annual cost profile for all ES&H activities to be funded is consistent with the overall funding decisions and target budgets for the planning period.

Resource planning and allocation are done on the basis of ES&H programs essential for compliance, fulfillment of ORNL missions, and assurance of the safety and well-being of ORNL personnel, the public, and the environment. Resource allocation is determined by supporting the highest-ranking activities within the target funding levels. Breakpoints are identified where the cumulative cost of the highest ranked activities equals the target level of funding. Activities below the breakpoints are unfunded for the planning period. The identification of target and unfunded ES&H activities is useful to ORNL management to (1) identify unfunded, risk-significant activities, (2) discuss alternative risk-management strategies, and (3) evaluate alternative resource allocation strategies.

#### **4.5.5 Future Direction: Program Management Tracking and Change Control Systems**

The value of having ES&H embedded in the business cycle is being demonstrated at ORNL. Achieving excellence in ES&H is accomplished through effective interaction between the line organizations and ES&H staffs and includes employee involvement at all levels. Line management is responsible for fully implementing ES&H requirements by developing systems and approaches that result in the effective management of ES&H risks and by creating a culture that effectively integrates employee and environmental protection into work planning, execution of work activities, and performance assessment and feedback.

ORNL management has recognized that it is beneficial, cost effective, and efficient to integrate ES&H management data into the information systems used at each Oak Ridge facility to manage and track projects for budgeting purposes. The Program Management Tracking System (PMTS) has been developed at ORNL to track projects and their requested funds. This includes information relative to ES&H and infrastructure support activities.

An important element in the planning and budgeting system is the control of significant funding allocation changes made during the life of a project/activity documented on an ADS. Laboratory overhead budgets are established prior to the beginning of a planned fiscal year. The DOE ORNL Site Office reviews and approves the annual overhead budget. The site office is notified for concurrence when a change or reallocation of funds in the overhead budget of greater than or equal to \$250K is proposed. Initial allocation and subsequent reallocation of capital asset (general plant projects and general-purpose equipment) funds are approved by the site office.

An integration working group has been formed to identify the necessary business requirements and data elements and develop the necessary programming and user interface for PMTS. ORNL will then be able to produce the information pertaining to ES&H management by extracting relevant data from PMTS. The need for additional, separate data development and input to respond to specific information requests concerning ES&H management will be significantly reduced. As a result, future information needs related to the ES&H Management Plan for ORNL can be developed quickly, consistent with other site planning and budgeting information.

## **4.6 EXECUTION OF WORK ACTIVITIES**

### **4.6.1 Line Management**

ORNL recognizes the importance of strong line management to assure that ES&H requirements are in full compliance with regulations. As support to line management, ORNL has implemented a Conduct of Operations Program to define and document needed policies, procedures, and programs and has developed a Facility Management Program for effective implementation of policies, procedures, and programs. ORNL line management authority is commensurate with assigned responsibilities.

#### **4.6.1.1 Conduct of Operations**

Experience has shown that the better operating facilities have well-defined, effectively administered policies, procedures, and programs to govern their activities. This includes many of the elements described by the operational principles in Attachment I to DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*. Those principles are based on well-developed industrial operation practices. Therefore, ORNL has established and implemented a program to control the conduct of operations (COO) and to set standards for application of the principles. This program has been established as part of the Facility Safety Program (FSP) to provide discipline and formality to the degree appropriate, based on the level of hazard and risk associated with facility operations. The program is described and documented in Facility Safety Procedure FS-8.0, "Conduct of Operations, which is being revised to better reflect ORNL WSSs.

The requirements of FS-8.0 apply to ORNL operations, including ORNL operations

physically located at Y-12 and the East Tennessee Technology Park (ETTP) (formerly the Oak Ridge K-25 Site). In implementing the COO Program, each ORNL division uses the guidelines of Attachment I to DOE Order 5480.19 in the review and development of existing and proposed procedures relating to the application of operational principles. A graded approach is used in the application of these principles to assure that the depth of detail required and the magnitude of resources expended for operations are commensurate with each facility's programmatic importance and potential ES&H impact.

The guidelines and principles of the 18 COO elements form a compendium of good practices applicable to ORNL. However, these guidelines were originally written to apply to nuclear reactor and other higher-hazard nuclear facility operations; therefore, many of the principles within the 18 elements are not applicable to all ORNL facility operations. Other principles are considered to be only recommended management practices and are implemented only at those facilities for which they are considered applicable or which have determined to implement the element as a management tool or best management practice.

The graded approach implemented in FS-8.0 allows ORNL organizations to tailor their implementation to balance the programmatic importance and potential ES&H impact of the facility or program activities and operations. To assist ORNL divisions in the application of a consistent, ORNL-wide, graded approach to implementation, a set of standards has been developed to define those ORNL facilities, systems, and operations where each element is considered to be applicable.

ORNL has adopted the use of an applicability and conformance matrix to determine and document (1) if a specific guideline/principle applies to a facility, (2) how a guideline/principle is applied within existing policies or procedures, and (3) any deviations or exemptions from the guidelines/principles. Applicability and conformance matrices are considered living documents and are reviewed and updated annually until all required actions are complete.

Each ORNL division maintains a set of applicability and conformance matrices that

- indicates whether a specific guideline applies to a facility;
- indicates where and how each of the guidelines is applied within the contractor's existing policies and procedures; and
- identifies any deviations or exemptions from the guidelines.

ORNL divisions are required to justify the nonapplicability of COO guidelines that are not applied according to ORNL standards. Justification can be as simple as "no shift operations exist at division facilities." Minimum standards of applicability for ORNL facilities, operations, and systems are listed in the procedure. Exceptions must be submitted to the director of ONS for approval if they involve an element shown in the procedure as applicable to the specific facility. Exceptions are reviewed every year as part of the annual self-assessment unless a determination is made and approved that the exception should be made permanent.

ORNL divisions are required to annually assess their operations and activities against

applicable COO guidelines to determine the effectiveness of their implementation. As a minimum, the self-assessment must include an evaluation of

- the effectiveness of the division documentation which implements the COO principles;
- an evaluation of exceptions to COO principles and their continued applicability; and
- lessons learned and operational improvements relative to the implementation of COO principles.

Records are maintained by each division to document their application of appropriate COO principles (i.e., logs, procedures, lockout/tagout records, etc.). The original Applicability and Conformance Matrix for each division/facility is also maintained in the division/facility files.

#### **4.6.1.2 Facility Management**

One of the key elements of ORNL's commitment to implementation of an effective COO Program is that line management take responsibility for their assigned facilities and the activities and operations conducted therein. Laboratory management assigns all interior and exterior areas at ORNL to clearly identified facilities, and the ownership and management responsibility for each facility is given to ORNL line management. ORNL line management is responsible for efficiently and effectively implementing a facility management program (FMP) for facility(ies) assigned to them by Laboratory management. The FMP is a plan or system under which action is taken toward implementing and executing facility management concepts in a line organization. The FMP focuses on describing how existing programs/documentation that are a necessary part of the FMP interact and interface within the organization to manage a facility effectively and efficiently. New programs/documentation necessary for an FMP are developed as needed.

Facility Management is defined at ORNL as a system by which a facility's operations are controlled to accomplish specific purposes, including as applicable (1) planning, organization, and managing facility operations; (2) coordinating facility operations with associated mission operations to complete the line organization's tasks and projects; (3) compliance with all LMER and DOE requirements; (4) appropriate support for the prevention or mitigation of major risks and consequences resulting from facility or mission operations; (5) COO applied to facility operations; and (6) facility maintenance and repair.

ORNL World Wide Web (WWW) sites that provide information reflecting the operational status and safety documentation status of ORNL facilities are available to ORNL personnel.

#### **4.6.1.3 Operational Readiness Review**

ORNL has an Operational Readiness Review and Readiness Assessment (RA) program which is administrated by the OQS. The program supports the requirements of applicable DOE Orders and Standards and is driven by ORNL Procedure X-GP-7, "Operational Readiness Reviews and Assessments." Activities and projects conducted at ORNL nuclear facilities are reviewed for applicability to Operational Readiness Review or RA requirements. Criteria from

the Operational Readiness Review program may also be used by ORNL facilities as an internal assessment mechanism for activities not requiring an official Operational Readiness Review or RA.

#### **4.6.2 Laboratory Support**

The Plant and Equipment (P&E) Division and the Instrumentation and Controls (I&C) Division provide the services needed in the maintenance of real property at ORNL to assure the continued service and safety of the facilities for their intended use. To support the work within these divisions, a computerized work management system (WMS) is used for tracking maintenance job requests. A preventive maintenance (PM) system is used to provide semiautomated scheduling of PM activities on buildings and equipment. Additionally, a hazardous material inventory system (HMIS) has been implemented to account for and track hazardous materials in work centers.

##### **4.6.2.1 Plant and Equipment**

P&E developed a special safety response team to address certain ORNL safety concerns, such as defective equipment, electrical hazards, improper lighting, unsafe walking surfaces, unguarded hazards near equipment, fire hazards, and air quality problems. This successful program has since been expanded to cover additional areas such as hoisting and rigging safety. P&E has assigned employees as permanent members of a team to review nonroutine lift plans for all ORNL divisions.

Personnel training and awareness are considered key to the ability to safely perform maintenance and support activities. Training of division personnel, consistent with industry standards and DOE orders, is continuously emphasized. Examples in support of this include the following:

- Safety and health (S&H) policy changes wherein individual S&H responsibility and accountability are emphasized have been issued as guidelines and communicated to all employees.
- Job-specific, performance-based training courses have been developed and implemented in several areas, such as electrical hazards, personal protective equipment, and several areas involving the HFIR.
- An electrical substation operator training program has been implemented.
- A self-paced video training series on electrical linemen safety has been designed and implemented.

Equal to, and in support of, training is the communication of safety and health and hazards information to division employees. P&E has established a program to assure that all important ES&H information is communicated to division employees. Communication methods include a listing of critical ES&H subjects and issues that is compiled and distributed to division employees weekly, special notices and bulletins, and regularly scheduled ES&H information

meetings. The methods of communicating ES&H information to division employees are based on the results of specific studies to determine the most effective means of communication within the division.

In planning and performing maintenance work in a safe and efficient manner, one key element to be combined with training and communication is the proper use of written procedures and work instructions. To ensure the safe planning and execution of division activities, P&E uses a “Planners Guide” that is applicable to planner/estimators and supervisors when planning maintenance activities. The Planners Guide requires the use of a graded approach to job planning and the completion of job planning packages to ensure that the applicable requirements of interfacing policies, procedures, and programs are incorporated into the work instructions. Job planning packages are reviewed and approved by the supervisor in charge of the job.

In developing job packages, a planner’s or supervisor's training, knowledge, and familiarity with the equipment and environment are combined with the required use of a walkdown checklist. This checklist includes various ES&H considerations to be addressed during the walkdown performed in support of job planning. The checklist includes considerations for hoisting and rigging concerns, general safety requirements, scaffolding and ladder requirements, personal protective equipment, environmental concerns, asbestos, confined space entry, fire protection, warning signs and barriers, electrical safety, hazardous chemical use, combustible material and flammable liquid storage requirements, as low as reasonably achievable (ALARA), radioactive material and waste-handling concerns, and others. The checklist also includes specific considerations for work permitting [hot work (welding, burning permits, fire watch), lockout/tagout, radiation work permits, safety work permits, etc.] and NEPA.

#### **4.6.2.2 Engineering and Construction Management**

Division 1 of a contracted construction project package defines design and plant requirements concerning security, operational interface, quality assurance (QA), submittals, sequencing of work, permits, design/build parameters, government-furnished material and equipment, field surveying, as-built information, parking, and available utilities such as electricity, water, toilets, and change rooms. Division 1 of each project specification is prepared in accordance with Engineering Procedure EP-D-20. Contractor requirements for waste management are also identified in Division 1 of each project specification. Specific details are provided for packaging, handling, storing, and transporting waste. The Land Quality Protection Team (LQPT) of OEP provides specific Division 1 environmental regulatory requirements for each project.

ES&H concerns and requirements for construction and construction-related service contracts are identified by ORNL’s Safety and Health Evaluation Support Team (SHEST) and compliance specialists in OEP. The concerns and requirements of SHEST and OEP are written into the Division 1 contract language for each project. This input delineates contract language for project specifications and contract responsibilities.

This package is outlined in the following process:

### Division 1 Process

**INPUTS:**

NEPA	}	Prepare
Quality Assurance Plan		Division 1
Regulatory documents		stand-alone
Site permits		documentation

**INPUTS:**

Industrial Hygiene requirements	}	Coordinate and assemble Division 1 support information
Radiation Protection requirements		
Waste Management Program		
Job description and sequencing		
Availability of utilities/services		
Security and FOCI		
Government Furnished Equipment List		
Fire Protection		

} Division 1  
Package

#### **4.6.3 ES&H Oversight (Internal)**

Several organizations, programs, and committees provide oversight, review, and support to ORNL facilities and activities. The oversight functions are discussed here.

##### **4.6.3.1 Environment, Safety, and Health**

The Health Division, OEP, ORP, OSHP, ONS, OLP, and OQS provide oversight and resources to support ORNL's ES&H goals, objectives, and strategies. Individual employees are responsible for ensuring that their work is carried out in compliance with ES&H requirements. Self-assessment against high standards of ES&H compliance is becoming an essential part of the ORNL culture. A broad ES&H functional program supports the line organizations in addressing ES&H issues and provides internal appraisals and audits to ensure that requirements are met. Primary ORNL ES&H objectives include the following:

- Maintain and continue improvement in the protection of worker safety and health.
- Involve all employees in preventing workplace accidents and illnesses and in protecting the public from off-site releases.
- Achieve and maintain compliance with H&S laws, regulations, orders, and agreements.
- Achieve excellence in all aspects of safety and health performance.
- Increase the satisfaction of our customers and stakeholders and their confidence in ORNL in managing safety and health performance for DOE facilities.

- Achieve integrated and consistent systems and teamwork in the medical, personnel health, industrial hygiene, industrial safety, and radiation protection areas.
- Achieve and maintain excellence through protection of the environment and full compliance with those requirements set forth in the WSSs agreed upon by LMER and DOE.
- Over the long term, achieve a minimum-discharge operation in which raw and used materials are reduced at the source, reused, or recycled. Ensure that any remaining discharges to the air, water, or land are minimal and are not considered harmful to people and the environment.
- Ensure that risks to the environment and human health posed by past operations are either eliminated or reduced to prescribed levels through cost-effective cleanup or containment.
- Continually improve the self-assessment process to identify issues, determine root causes, develop and validate corrective action plans, monitor progress, verify completion, identify trends, and document lessons learned.
- Improve systems for the dissemination of requirements by identifying needs for policies and procedures to implement those requirements set forth in the WSSs agreed upon by LMER and DOE.

#### **4.6.3.2 Safety and Health Evaluation and Support Team**

The SHEST is a multidisciplinary team with the responsibility of identifying, evaluating, and controlling personnel H&S hazards associated with construction activities, hazardous waste operations and emergency response (HAZWOPER), and work performed by service subcontractors at ORNL. SHEST activities are coordinated from multiple disciplines and program areas in the ORNL OSHP and are further defined in a series of standard operating procedures. SHEST support is provided for applicable activities from task inception through task completion. SHEST members serve as a single point of contact and interface with program managers and subject matter experts from ES&H organizations within the ORNL OESH Directorate. As a single point of contact, SHEST members are also recognized as having an interface role in providing guidance and support to their customers (e.g., service subcontractors) in the related areas of environmental compliance, radiation protection, and waste management.

SHEST members have authority to represent OESH in meetings and field oversight activities associated with the projects and activities which the team supports and to approve H&S plans, specifications, or other types of H&S documentation developed as control mechanisms for those projects and activities. SHEST members also have the authority to request information and services from OESH organizations external to the team and to require timely response in support of customer needs.

For ORNL construction activities, SHEST responsibilities include working with the LMER

project manager to

- coordinate OESH input into preliminary site/project assessment;
- maintain a daily working interface with construction contractor safety and health personnel through coordinated joint inspections of their active construction sites;
- support the resolution of any ES&H problems identified on construction projects;
- conduct bimonthly safety meetings with construction contractor safety and health personnel and/or their management to discuss construction problems and issues;
- issue Hot Work Permits for construction projects;
- issue Safety Work Permits for tasks performed by the P&E Division or service subcontractors on construction projects;
- review construction interface documents for changes in safety and health requirements during construction;
- track and trend problems in safety and health performance by the subcontractors; and
- participate in project final walk-through inspection and acceptance.

For HAZWOPER, SHEST responsibilities include

- managing the ORNL HAZWOPER Program for ORNL projects and activities;
- developing and maintaining policies and procedures for management and implementation of the HAZWOPER Program and promoting compliance with the HAZWOPER standard;
- interfacing and coordinating with OESH functional area program managers and representatives to determine potential H&S hazards, appropriate control measures for hazardous waste operations and emergency response activities, and the regulatory status of project sites;
- verifying compliance with HAZWOPER requirements through surveillance and periodic inspection;
- providing technical guidance, support, and oversight to the Waste Management and Remedial Action Division to ensure RCRA treatment, storage, and disposal facilities meet HAZWOPER requirements;
- providing technical guidance, support, and oversight to ensure that the ORNL emergency response organization(s) meet the requirements under 29 CFR 1910.120(q) for the "releases of, or the substantial threats of releases of, hazardous substances without regard

to the location";

- supporting the determination of worker training requirements and the development of HAZWOPER training courses; and
- interfacing with the ORNL Health Division to maintain an up-to-date list of workers included in the Hazardous Waste Worker Medical Surveillance Program.

For service subcontract safety and health, SHEST responsibilities include

- providing guidance to service subcontract coordinators, project managers, facility managers, and requesters on program implementation;
- evaluating identified ES&H concerns associated with (and supporting completion of) proposed service subcontractor Project Safety and Health Checklists;
- developing written, job-specific safety and health requirements and control mechanisms to be incorporated into the job specifications for implementation during the on-site work activity. This includes (1) determination of applicable ES&H requirements, (2) identification of H&S controls, (3) requiring submittal of H&S documentation as necessary, and (4) defining approval authority for submittals;
- drafting and obtaining concurrence for oversight plans for subcontractor activities;
- approving procurement of the subcontractor under conditions of specified ES&H controls and the oversight plan;
- participating in prebid conferences, reviewing H&S plans submitted by the subcontractor, and providing approval for implementation of H&S plans; and
- advising requester on subcontractor's safety history when submitted for review.

#### **4.6.3.3 Director's Review Committees**

The Director's Review Committees (DRCs) were established in 1961 subsequent to a number of radiation-related incidents in ORNL facilities involved in work with nuclear materials. These committees were given review jurisdiction over facilities and operations within their assigned field of expertise. This oversight was maintained through a review and approval process directed at experiments, new operations, and tests and grew to include the safety analysis documentation for these operations and facilities. Currently, there are three committees, including the Accelerator Safety Review Committee (ASRC), the Criticality Review Committee (CRC), and the Reactor Review Committee (RRC).

Each committee has a charter which defines its area of responsibility and methods of operation. Members are selected by the committee chairman and are recommended for

appointment by one of the ADs. Typically, each committee meets as necessary to conduct the appropriate reviews as situations dictate. Some committees, such as the RRC and the CRC, conduct an annual review of the activities for which they have oversight responsibility. A report of their review is submitted to ORNL senior management and the division managers responsible for the operation or facility reviewed. Corrective actions resulting from the reviews are tracked until resolved to the satisfaction of the DRC.

- *Criticality Review Committee (CRC)* - The CRC provides ORNL management with independent nuclear criticality safety (NCS) program oversight for the management and operation of nonreactor nuclear facilities in which fissionable material is processed and stored (including reactor fuel) and for transfers of fissionable material within and between such facilities. The CRC acts in an advisory capacity to ORNL and line management regarding the status of the administrative and technical conditions of ORNL's NCS program.

The CRC is composed of at least five members chosen to provide technical competence in the areas of NCS, nuclear chemistry, fissile material process control, and facility safety analysis. The CRC was established to comply with the requirements of American National Standards Institute/American Nuclear Society (ANSI/ANS) 8-series standards.

- *Accelerator Safety Review Committee (ASRC)* - The ASRC is composed of members with expertise in accelerator design and/or operations, related experimental systems, or radiological safety. All members are senior staff personnel with experience in the disciplines necessary to evaluate the safety of design, construction, operation, maintenance, and modification of accelerator facilities. Normally, membership will include scientists and engineers from ORNL research or support divisions, a health physicist, and a technical safety staff member. The number of members is never fewer than four.

The ASRC is accountable to the AD for Advanced Materials, Physical, and Neutron Sciences upon the recommendation of the ASRC Chairman and the director of ONS. Members are encouraged to otherwise engage in some aspect of accelerator R&D to maintain and expand the overall capabilities and experience base of the committee. However, no member is allowed to participate as a reviewer when an ASRC review includes items or projects to which the member has substantially contributed.

- *Reactor Review Committee (RRC)* - The RRC performs internal independent review of reactor operations and reactor uses to help assure the safety of those activities and that all reactor operations are in full compliance with appropriate DOE orders. The RRC provides independent safety oversight of reactor facilities, management programs, operational programs, and equipment modifications, and for the management operations of reactor experiments and experimental facilities. In providing this oversight, the committee has two major functional subgroups: (1) the Reactor Operations Review Committee (RORC), which addresses reactor operational issues, and (2) the Reactor Experiments Review Committee (RERC), which addresses issues associated with experimental programs. The RRC is accountable to the AD for Advanced Materials, Physical, and Neutron Sciences.

#### **4.6.3.4 Radiation Protection**

The three principal statements of the ORNL Radiological Control Policy are

- **ALARA.** Radiation exposure of the work force and the public shall be controlled so that radiation exposures are well below regulatory limits and that no radiation exposure occurs without commensurate benefit. Individual and collective radiation exposures shall be maintained as low as reasonably achievable (ALARA) while ensuring that individual rights and opportunities are protected and while achieving the research and operational goals of ORNL.
- **OWNERSHIP.** Each person involved in radiological work is expected to demonstrate responsibility and accountability through an informed, disciplined, and cautious attitude toward radiation and radioactivity.
- **EXCELLENCE.** Excellent performance is evident when radiation exposures are maintained well below regulatory limits, contamination is minimal, radioactivity is well controlled, and radiological spills or uncontrolled releases are prevented. Radiation protection oversight and monitoring are provided through the ORP. The ORNL Radiological Protection Procedure Manual contains the established procedures for the conduct of radiological control for all employees, subcontractors, guests, and visitors at ORNL or ORNL-managed facilities.

#### **4.6.3.5 Emergency Preparedness**

Due to the nature of the work performed at ORNL, the operating philosophy of the site is far more safety-oriented than that of most industrial plants. Safety policies, procedures, practices, committees, and engineered safeguards are designed to ensure safe working conditions for ORNL employees. It must be recognized, however, that in any major R&D complex, the best safety practices cannot eliminate the possibility that certain hazardous conditions can develop. When such conditions endanger or adversely affect personnel, the public, the environment, or property and necessitate immediate corrective action, they are termed emergencies. Emergencies may involve one or more employees; they may involve varying levels of environmental threat; they may result in no equipment damage or in considerable property loss. At any level, the severity of their consequences can be minimized by alert, trained personnel and properly initiated action. All employees are responsible for reporting, assessing, and resolving emergency situations within their areas of responsibility as rapidly as possible.

The ORNL emergency preparedness program is designed to ensure that personnel are prepared to take timely and proper action to mitigate the severity of emergencies and their consequences and to ensure the safety of on-site personnel, members of the general public, and the environment. Planning, preparedness, and response capabilities are developed and maintained to minimize the consequences to personnel, the public, the environment, and national security from potential accidents involving ORNL operations. Emergency preparedness programs are developed and maintained commensurate with the materials,

processes, and attendant hazards to minimize the potential consequences of accidents. An effective level of emergency planning and training is maintained with coordination in general approach and nomenclature among elements within LMER, DOE, other federal agencies, private industry, state, and local authorities. Drills and exercises are also conducted to test the responsiveness to credible emergencies. Capability is maintained to respond to emergencies in an effective and timely manner to mitigate the consequences and bring an emergency situation under control.

Provisions of applicable DOE orders and federal, state, and local laws and regulations regarding notification of, and response to, operational emergencies, energy emergencies, and continuity of government emergencies are always within full compliance. The specific drivers for the ORNL Emergency Preparedness Program are 29 CFR 1910.38 (Subpart E) and 29 CFR 1910.119 (Subpart H).

The emergency preparedness program is documented in ORNL/CF-91/71/R2, “X-10 Site Emergency Plan.” The plan represents ORNL’s implementation of the Emergency Management Standards. These standards incorporate information and data compiled in the emergency response plans for DOE Oak Ridge Operations Office and state and local governments and are intended to coordinate all Oak Ridge Operations emergency preparedness and response programs. Most emergency situations will be confined to, and controlled within, a single site; however, some types of emergencies have the potential to involve multiple sites or to affect local off-site populations. The “X-10 Site Emergency Plan” details the following information for ORNL:

- *Emergency Response Organization.* A description of the overall organization of ORNL and that of the emergency response organization, including supporting committees. Also described is the emergency management command structure and operations.
- *Office Response Interfaces.* Descriptions of the formal and informal interactions between the site’s emergency management and local, state, and federal agencies for emergency support, mutual aid, and regulatory control responsibilities. Also included are local subcontractors to DOE with emergency response capabilities.
- *Operational Emergency Event Classes.* Definitions of the three classifications of operation emergencies, with general criteria and responses for each class, and descriptions of the current status of the facility-specific emergency action levels for the site.
- *Notification and Communications.* A discussion of the on-site communications for notification of an emergency, the notification process and means for on-site personnel and off-site agencies, and the notification of any persons within the two-mile Immediate Notification Zone. Also discussed is communication among members of the emergency response organization.
- *Consequence Assessment.* A description of the methods used for the initial and ongoing consequence determinations and coordination of this information with affected off-site agencies.
- *Protective Actions.* Descriptions of the available protective actions for on-site and off-site

personnel, their intended purpose, and the guidelines for their use, including *Protective Action Guides* (PAGs) and *Emergency Response Planning Guidelines* (ERPGs).

- *Medical Support.* A description of the medical capabilities on the X-10 Site and the off-site facilities available in this region.
- *Recovery and Reentry.* A discussion of the means for downgrading and terminating an emergency and how reentry is accomplished. Included is a discussion of the recovery phase after the emergency is ended.
- *Public Information.* A description of the organization and facilities available to provide current information to the media and the public during an emergency and steps taken toward public education about off-site response.
- *Emergency Facilities and Equipment.* A discussion of the facilities available for emergency management and response and the equipment available for the emergency response organization.
- *Training.* A discussion of the requirements and courses available for all employees and nonemployees on the X-10 Site.
- *Drills and Exercises.* A description of the drill and exercise programs for on-site personnel and facilities and coordination with off-site agencies.
- *Emergency Management Program Administration.* A discussion of the control of the emergency plan and the assessment of the emergency management program.

#### **4.6.3.6 Fire Protection**

The ORNL Fire Protection Program is intended to comply with contractual obligations; the N&S elements of DOE orders, policies, and guides; mandated fire protection codes and standards; and applicable Occupational Safety and Health Administration (OSHA) requirements. The primary Fire Protection Program objectives are to

- minimize the potential for the occurrence of a fire,
- establish requirements that provide an acceptable degree of life safety to all on-site personnel and ensure there are no undue hazards to the public from fire or related peril,
- ensure that fire does not cause an unacceptable on-site or off-site release of radiological and other hazardous material that will threaten public H&S or the environment,
- ensure that critical process controls and safety systems are protected against damage by

fire or related peril,

- ensure that vital DOE programs will not suffer unacceptable delays as a result of fire and its effects, and
- ensure that property damage from fire and related perils are kept minimal by applying cost-effective loss conservation principles and fire prevention techniques.

DOE facilities are characterized by a level of fire protection sufficient to fulfill the requirements for the best protected class of industrial risks (Highly Protected Risks) as defined by private insurance carriers for the protection of industrial property. This is an important concept since DOE is self-insured with no private insurance to cover property losses. The ORNL Fire Protection Program is designed to provide the most economical level of protection in concert with the “Highly Protected Risk” concept.

The primary elements of the Fire Protection program consist of a site Fire Protection Manager, Fire Protection Engineers, Fire Department Operations, General Engineering, P&E Maintenance Organizations, Facility Managers, and a Fire Protection Program Coordination Committee (FPPCC). Each element has unique responsibilities and guidelines which, when accomplished in a quality manner, result in an effective, efficient, and economical program. The overall program concept is the responsibility of the Fire Protection Manager, who is also responsible for implementation, coordination, and oversight of the program.

Fire Protection Engineering maintains and provides a staff of qualified professional fire protection engineers to ensure adequate fire protection based on levels of risk, conduct comprehensive fire protection engineering assessments of ORNL facilities, provide interpretation of fire codes and standards, review planned building designs and modifications, and provide technical support and evaluation of fire protection activities at ORNL.

Fire Department Operations maintains and provides a fire response capability with sufficient equipment and highly trained personnel to perform fire ground management, emergency rescue, and manual fire suppression. Fire Department personnel also conduct building and site inspections, perform tests of fixed and mobile fire protection equipment, and coordinate the maintenance of fire equipment and systems as required or needed. The Fire Chief has responsibility for all Fire Department Operations activities at ORNL.

The FPPCC has a membership consisting of representatives from Fire Protection Engineering, Fire Department Operations, P&E Division, General Engineering, and Facility Management. The objectives of the committee are to maintain open lines of communication between organizations with responsibilities in the Fire Protection Program and to serve as a problem-solving forum relative to fire protection activities and interfaces. The committee leader of the FPPCC is appointed by the Fire Protection Manager.

Requirements of the Fire Protection Program include contractually approved WSSs, federal law, applicable National Fire Protection Association standards, applicable building codes, and

DOE contractual obligations.

#### **4.6.3.7 Transportation Safety**

The Transportation Safety Program at ORNL assures that procedures are instituted to establish safe and consistent transportation activities and to conduct hazardous materials transportation and packaging in full compliance with applicable U.S. Department of Transportation (DOT) regulations; other federal, state, and local laws and regulations; and DOE. ONS provides functional and management requirements and responsibilities to ORNL operations. A Transportation Safety Compliance Manager is appointed to manage the transportation program for the Oak Ridge Operations sites. ORNL has an appointed Transportation and Packaging Manager to centrally manage hazardous materials transportation and packaging operations. To assure that affected individuals utilizing the transportation system are knowledgeable of their responsibilities, the transportation training program is administered in accordance with DOT Hazardous Materials Regulations, Federal Motor Carrier Safety Regulations, and DOE orders.

#### **4.6.3.8 Pollution Prevention Program**

The Pollution Prevention Program accomplishes its mission of reducing waste creation and resource use through several functions. The program tracks and documents efforts, promotes goals, and provides funding and technical assistance to reach those goals.

In 1997, the Pollution Prevention Program completed required reports, including the ORNL Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1996, which describes activities ORNL has undertaken to meet reduction goals established for each waste stream, and the Secretary of Energy Notice (SEN) 37 Report describing projects, waste generation, funding status, and goals. The program also completed the summary information for inclusion in the Resource Conservation and Recovery Act (RCRA) Annual Hazardous Waste Report. ORNL's pollution prevention performance measure is submitted biennially as documentation in ORNL's pilot of reduced oversight. The program presented yearly ORNL Director's Pollution Prevention Awards and made submittals on ORNL projects for DOE Site and Headquarters awards as a way of recognizing projects. These awards are another way of documenting successes.

The program works continually to achieve and surpass the goals set by DOE for pollution prevention. By December 31, 1999, DOE requires ORNL to reduce the routine generation of radioactive, mixed, and hazardous waste by 50%, to reduce generation of sanitary waste by 33%, and to reduce by 50% the amount of toxic chemicals released and the amount sent off-site for treatment or disposal. All operations, including cleanup, have a goal of recycling 33% of sanitary waste and making 100% of purchases recycled content (unless appropriate products are not available in the market).

To help achieve these goals, the Pollution Prevention Program operates recycling programs for white and mixed paper, cardboard, aluminum cans, toner cartridges, laboratory plastic, and coal ash and also assists in completion of pollution prevention projects through assistance

and funding. The HiVal and Generator Set-Aside programs both provide monies for pollution prevention. DOE allots a specified amount each year to the three Oak Ridge Operations sites to fund HiVal projects. Submittals are made to a three-site HiVal committee which determines the projects that receive funding based on ranking criteria.

Generator Set-Aside Fund (GSAF) funds are collected during the year from a tax on wastes generated at the site. Projects submitted for these funds are judged by the Pollution Prevention Representatives (PPRs) from the ORNL divisions based on weighted criteria. The PPRs determine who receives GSAF funding. With each project funded, the program moves closer to its ultimate goal of zero waste generation.

#### **4.6.3.9 Environmental Restoration and Waste Management**

Currently, environmental restoration and legacy waste management activities at ORNL are the line responsibility of the LMES Environmental Restoration and Waste Management Programs. Several hundred sites at ORNL are contaminated with radionuclides and/or hazardous chemicals. These sites include inactive underground waste storage tanks, leak and spill sites, radioactive waste burial grounds, and approximately 85 contaminated facilities (including five reactors) that require remedial actions, plus significant contamination of surface water, groundwater, and biota. Multiple areas of contamination are connected within a complex geological and hydrological setting in which plumes have mingled, so remedial activities must consider surrounding and downgradient areas.

A Federal Facility Agreement among DOE, the state of Tennessee, and the Environmental Protection Agency provides a framework for actions to protect human health and the environment, achieve compliance with environmental regulations, and meet the expectations of the public.

In support of ORNL's research and development activities, the Waste Management Program at ORNL provides continuous collection, treatment, and discharge of gaseous waste; treats 535 million liters (150 million gallons) per year of liquid radioactive waste (excluding sewage); and manages about 6200 cubic meters per year of solid radioactive, hazardous, mixed, and sanitary/industrial wastes. Major waste management activities include comprehensive coordination of waste reduction; integrated strategic and long-range planning; upgrades of existing facilities and construction of new facilities; performance assessments of solid waste storage areas and other waste disposal facilities; waste collection and certification; and waste treatment, storage, and disposal. The Waste Management and Remedial Action Division (WMRAD) operates 139 facilities (42 nuclear, 40 radiological, and 57 nonradiological or other industrial) and associated systems that are used for treatment, storage, and/or disposal of these wastes.

## **5. ES&H PERFORMANCE ASSESSMENT AND IMPROVEMENT**

## **5.1 PERFORMANCE ASSESSMENT PROGRAM**

The LAP manages and coordinates all assessment activities at ORNL pertaining to ESH&Q and other business-related management activities. Philosophy and guidance are found in the Assessment Program Plan for ORNL (ORNL/CF-94/55), Laboratory Directive X-QA-10, “ORNL Self-Assessment Programs,” and ORNL Internal ESH&Q Appraisal Protocol document (ORNL/CF-94/24), “Environment, Safety, Health and Quality Integrated Management Assessment Protocol.” Assessment activities are organized around six functional areas:

- improvement through rigorous self-assessment at the line and working level,
- independent QA audits and independent integrated management assessments,
- coordination and integration of internal and external evaluations of ORNL,
- commitment management and resolution,
- reporting and dissemination of alerts and lessons learned, and
- implementation and maintenance of the ORNL Lead Auditor Certification Program.

The goal is to establish a program of continuous self-assessment and self-improvement that is verified by a coordinated and integrated system of internal and external oversight. With an established and credible performance assessment program, the basis exists to maximize the benefits to and minimize the impact on ORNL.

## **5.2 SELF-ASSESSMENTS**

The Laboratory’s self-assessment programs are designed to achieve customer satisfaction through management assessment and continuous improvement involving all personnel. Minimum requirements for development and implementation of ORNL division- or office-level self-assessment programs are found in Laboratory Directive (Procedure) X-QA-10, “ORNL Self-Assessment Programs.” This procedure includes appendices that provide guidance for preparation of a self-assessment plan and the annual self-assessment summary. The requirements of Procedure X-QA-10 are applicable to ORNL central management and to all divisions and offices (including those located at the Y-12 Plant and the K-25 Site) and all facilities and activities under their control. All applicable areas of evaluation are addressed in division or office self-assessment programs.

To support the effective planning of self-assessment, the ORNL Assessment Program Manager develops self-assessment methodology, assessment procedure(s), and other guidance documents and monitors their effectiveness and revises the documents as necessary. The Assessment Program Manager also reviews and provides input for division or office self-assessment plans.

In support of implementation of the self-assessment program, the ORNL Assessment Program Manager provides input to the program concerning institutional issues identified through the Lessons Learned System. The program manager identifies those lessons learned that are significant and applicable to ORNL organizations and distributes them to the appropriate division or office director. Institutional issues are presented to ORNL senior management.

The Assessment Program Manager also monitors the effectiveness of the self-assessment process and provides guidance to the ORNL divisions or offices concerning the direction and implementation of the program. The effectiveness of the self-assessment process is reported periodically to the ESHQC and/or Operating Committee.

ORNL division and office directors provide the necessary resources, direction, and support for planning and implementation of the self-assessment program. This includes assurance of adequate training for self-assessment participants and communication of the overall results of self-assessment activities to all division and office employees.

The division and office directors actively implement and participate in self-assessments on an ongoing basis, including periodic discussions with other division or office self-assessment participants to share implementation plans, results, and any other issues related to self-assessment, and approve self-assessment plans. Division and office self-assessment plans are reviewed annually and revised as necessary.

Each division and office director produces an annual self-assessment summary by February 1 of each year, recognizing notable strengths and weaknesses and identifying possible institutional issues. This annual summary incorporates the results from division or office self-assessment activities and other ORNL internal assessments, as well as external assessments.

### **5.3 INDEPENDENT INTERNAL ASSESSMENT**

The ORNL ESH&Q Integrated Management Assessment Program provides an independent management oversight function for divisional ESH&Q activities. Commonly referred to as “internal assessment,” the program is guided by the ORNL Internal ESH&Q Assessment Protocol document, ORNL/CF-94/24, which establishes guidance on preparing and conducting internal ESH&Q integrated management assessments of ORNL divisions. The protocol requires that teams conducting internal management assessments use Lines of Inquiry.

Based on the definitions of internal assessments and management assessments found in 10 CFR 830.120, the internal assessment at ORNL is a tool used by senior ORNL management for self-assessment. ORNL conducts site-wide and division-level internal assessments of ES&H and safeguards and security programs at intervals which ensure that each division is appraised at least once every three years.

The scope of ORNL's internal assessments includes review of the self-assessment program of each ORNL division and office, facility management (including process and facility safety); environmental protection and waste management, ES&H management, and quality programs management.

Division quality and self-assessment programs are also appraised against requirements of 10 CFR 830.120 and Laboratory Directive X-QA-10, "ORNL Self- Assessment Programs."

Each division is appraised in various safety and health functional areas based on guidance contained in applicable discipline manuals and the ORNL Internal ESH&Q Assessment Protocol document, CF-94/24, as described above.

An examination of each division's procedures is conducted to identify opportunities for improvement of procedures management systems. Also, as a component of a best management practice initiative to reduce the number of evaluation activities at ORNL, DOE-ORO and internal committees such as the ASRC are invited to participate in internal assessments as team members.

Each of the divisions at ORNL applies a graded approach to its own self-assessment, and the internal assessment process recognizes that all elements of each of the internal assessment review requirements may not apply to all divisions. The internal assessment team should assess the division's approach to "grading" through evaluating the types of work conducted in the division. Finally, it should be emphasized that independent internal assessments focus on each of the areas in the scope from a management perspective. At ORNL, ESH&Q compliance is a line management responsibility; independent internal assessments are used to determine if management systems are in place to ensure compliance.

## **5.4 EXTERNAL ASSESSMENTS**

External assessment is the process by which an organization external to ORNL evaluates the performance of ORNL activities against ESH&Q requirements. These assessments are typically conducted by Lockheed Martin Corporation, DOE, and federal and state regulators. The LAP Manager is responsible for coordinating and integrating external assessments and coordinating ORNL review of and response to external assessment reports. Results of Lockheed Martin corporate audits are available to DOE. An ORNL Internal ESH&Q Assessment Protocol document, ORNL/CF-94/56, has been prepared to establish understanding, guidance, and expectations for ORNL's external and internal assessments. This information is provided to ORNL organizations subject to assessments, as well as to the organization performing the assessment. The protocol is established to coordinate and integrate external and internal assessments to assure optimum return to ORNL from the assessment, to minimize programmatic impact, and to eliminate redundancy.

## **5.5 COMMITMENT MANAGEMENT AND RESOLUTION**

ORNL uses the Laboratory Issues Database System (LIDS) as a central tracking and trending system to track commitments and action items from external assessments, independent internal assessments, occurrences, and potential Price-Anderson noncompliances. The use of a central tracking system allows for sharing of information across multiple organizations. After an issue is posted on LIDS, a corrective action plan is generated by the evaluated organization. The plan is validated to ensure that the actions will effectively correct the issue as well as the root cause. Validation of the corrective actions is typically performed by the OQS or by the assessment team. The corrective action items and associated schedules are also entered in LIDS for tracking. Following corrective action completion, independent verification of objective evidence is necessary for closure.

Corrective actions resulting from line organization self-assessments are developed and tracked at the division or office level. LIDS is available for tracking these items; however, its use is not required.

## **5.6 ES&H CONTRACT PERFORMANCE MEASURES**

The LMER–DOE contract is performance-based; it provides for the use of performance measurements to promote continuous improvement and provides a basis for evaluating contractor performance. The performance measures relate directly to LMER and DOE strategic objectives and are measures of outcomes or results. They are managerial indicators consisting of peer review evaluation scores and a composite of data expressed as summaries, ratios, or indices, and they reflect top-level organizational or functional measures of results. The measures do not replace or eliminate subordinate process-level performance measures that are maintained and used by organizations to control and improve the performance of their processes.

The results of the FY 1997 ES&H performance measures are reported in Section 6.1. A significant change in the performance-based reporting was approved for FY 1998. A set of critical outcomes, objectives, and performance indicators has been developed for ES&H integration. This integration will systematically integrate ES&H into management, operations, and work practices.

## **5.7 ES&H OVERSIGHT REDUCTION PROGRAM AND PERFORMANCE MEASURES**

Beginning in FY 1996, ORNL and DOE agreed to develop a pilot program to improve the overall ES&H program at ORNL. The pilot program, ES&H Oversight Reduction Program and Performance Measures, uses a performance-based management system. The objective is to reduce ES&H oversight costs to DOE and ORNL while maintaining or improving ES&H performance. The ES&H pilot program is also designed to provide direction for restructuring the oversight of ORNL while maintaining or improving ES&H performance. The ES&H pilot

program is also designed to provide direction for restructuring the oversight of ORNL by DOE.

Appendix F contains the FY 1997 ending pilot program report. The performance measures were jointly developed by ORNL ES&H staff and DOE personnel to drive performance improvement and focus on evaluating the effectiveness of systems and maintaining the appropriate level of internal controls. The performance measures focus on improved and positive performance rather than on maintaining status quo. The performance measures include criteria which are objectively measurable and allow for meaningful trends.

## 5.8 PERFORMANCE INDICATOR PROGRAM

ORNL utilizes a Performance Indicator Program to drive improvement and characterize the progress toward meeting each performance measure by line management. The indicators were designed to be tools used by ORNL ES&H managers, division directors, and senior management to aid in the assessment of the performance of a particular program or functional area.

## 6. FY 1997 ES&H PERFORMANCE SUMMARY

This section provides a summary of ORNL ES&H performance for the prior budget year (FY 1997).

### 6.1 STATUS OF FY 1997 ES&H PERFORMANCE MEASURES

There are three performance measures for ES&H under the LMER–DOE contract. These performance measures are in the operations support area and are discussed in Section 5.6.

Following are the results of those performance measures for FY 1997:

Measure (Custodian)	Performance Targets	FY 1997 Results	Comments
OS-E: DOE Safety Index (Safety and Health Protection)	Above 26.12 Unsatisfactory 22.24 to 26.12 Marginal 14.45 to 22.23 Good 10.56 to 14.44 Excellent Below 10.56 Outstanding	21.8 Good	Data from 7/96 through 6/97
OS-F: Nuclear Safety Violation Index (Occurrence Reporting)	Above 2.10 Unsatisfactory 1.89 to 2.10 Marginal 1.45 to 1.88 Good 1.24 to 1.44 Excellent Below 1.24 Outstanding	4 Unsatisfactory	Increase due to 2 additional occurrences during this period. Corrective Actions have been initiated to address the occurrences.

OS-G: Environmental Permit Violations (Environmental Compliance Organization)	Above 3.29 2.78 to 3.29 1.73 to 2.77 1.21 to 1.72 Below 1.21	Unsatisfactory Marginal Good Excellent Outstanding	3 Marginal	3 NOVs Clean Water Act
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## 6.2 SUMMARY OF ES&H INDIRECT ACTUAL COSTS FOR THE PRIOR YEAR (FY 1997)

NOTE: Planned FY 1997 ES&H budget data in Section 6 and the tables in Appendix G contain the original data in the FY 1999 Budget Formulation Plan submission. No changes were made to any cost and funding data. Sections 6.2 through 6.4 explain significant differences between planned and actual FY 1997 costs and funding.

Total planned indirect ES&H costs for FY 1997, shown in the ES&H ADSs included in the FY 1999 ES&H Budget Formulation Plan, were as follows:

Functional Area	Indirect Funding	
	Target	Unfunded
Safety and Health	\$20,014K	\$1,863K
Environmental	7,013K	955K
Total	\$27,027K	\$2,818K

A complete listing of ORNL ES&H ADSs for FY 1997 is included in Appendix G, Table G.1. Appendix G, Table G.2, shows FY 1997 Indirect Target ADSs.

Indirect target ADSs are those activities being funded by ORNL's overhead budget allocation. Typically, these activities are core functions required to achieve and maintain compliance to requirements set forth in the WSSs agreed upon by LMER and DOE. Indirect unfunded activities (Table G.3) are supplemental activities which would improve compliance systems.

Actual ES&H indirect expenditures (Laboratory Overhead) for FY 1997 were as follows:

ES&H Indirect (Laboratory Overhead)	FY 1997
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Environmental Protection	\$ 5,471K
Medical (Health Protection)	2,631K
Laboratory Protection Emergency Preparedness Fire Protection Engineering	2,432K
Safety Programs Safety and Health Protection Operational Readiness and Facility Safety	6,783K
Quality	2,165K
Radiation Protection	4,729K
Operations Support of ES&H Activities	2,594K
Overhead Support for Previous KG-Funded Projects - OSHA Compliance, Machine Guarding (\$15K) - OSHA Compliance, RAC 3 Electrical (\$5K) - OSHA Compliance, RAC 3 Nonelectrical (\$21K) - OSHA Compliance, Building Grounding (\$6K) - Lead Shop Pilot Project (\$80K) - 4500S Sprinkler Valve Replacement (\$95K)	222K
Total	\$27,027K

### 6.3 SUMMARY OF ES&H DIRECT ACTUAL COSTS FOR PRIOR YEAR (FY 1997)

Total planned direct ES&H costs for FY 1997, as documented on ES&H ADSs included in the FY 1999 ES&H Budget Formulation Plan, were as follows:

Functional Area	Direct Funding	
	Target	Unfunded
Safety and Health	\$30,402K	\$ 1,465K
Environmental	12,798K	100K
Total	\$43,200K <sup>1</sup>	\$1,565K <sup>2</sup>

<sup>1</sup>FY 1997 ADSs for direct funded target activities are shown in Appendix G, Table G.4.

<sup>2</sup>FY 1997 ADSs for direct unfunded activities are shown in Appendix G, Table G.5.

The following is a listing of planned and actual direct ES&H cost for FY 1997 by DOE Program elements:

Program	Planned	Actual
DA Activities <sup>1</sup> (Appendix G, Table G.4.1)	\$ 6,961K	\$ 6,961K
DI Activities <sup>2</sup> (Appendix G, Table G.4.2)	15,681K	15,681K
HFIR Operating Cost <sup>3</sup> (Appendix G, Table G.4.3)	12,196K	12,196K
KG Program Cost <sup>4</sup> (Appendix G, Table G.4.4)	2,602K	2,324K
KC Program Cost <sup>5</sup> (Appendix G, Table G.4.5)	5,760K	3,402K
Other Programs <sup>6</sup>	0K	132K
Total (Appendix G, Table G.4)	\$43,200K	\$40,696K

<sup>1</sup>From the direct target ADSs, \$6,961K was designated spending by R&D divisions and programs from their division programmatic funds in support of ES&H needs. These activities included support for internal division personnel with dedicated ES&H roles (e.g., division safety officer) and other expense activities such as the correction of safety shower and eyewash station deficiencies. In addition, direct target funds reported were from expected funding to support projects and activities with an identifiable percentage for ES&H support as well as infrastructure support. Direct unfunded ADSs were for ES&H activities which would improve compliance (Table G.5). Unfunded items were continually reviewed to determine if funding allocations need to be adjusted to allow for completion of these activities.

<sup>2</sup>From the direct target ADSs, \$15,681K was designated cost by ES&H organizations which was distributed to other ORNL divisions/offices/programs for personnel and other resources. These funds were not provided through the Laboratory overhead budget.

<sup>3</sup>HFIR ES&H operating cost is \$12,196K as identified on ADS E93D0021, "High Flux Isotope Reactor Operation." This funding recognizes costs for ES&H related activities which would be funded through the Basic Energy Sciences Program activities.

<sup>4</sup>Actual FY 1997 KG Program cost is primarily for ES&H expense and capital funding requirements associated with Landlord activities. (Note: Landlord responsibilities were reassigned from KG to KC prior to FY 1997.)

Activity	Type	Cost
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Replace UST - Building 3047	GPE	\$ 0.4K
Replace UST - Building 3132	GPE	0.5K
Replace CFC Chillers - Building 4509 Units 1, 2, and 3	GPE	600K
Replace CFC Chiller - Building 7920	GPE	138K
Replace UST - Building 2521	GPE	132K
Replace Primary Transformers - Building 7901	GPE	60K
Dechlorination System Upgrades (X-10 Site)	GPE	11K
Form Roller, Building 7012	GPE	1K
Building 9201-3 HVAC Upgrades	GPP	206K
3000 Area Waterline Isolation Valves	GPP	470K
Building 9210 Emergency Generator	GPP	50K
Building 9210 HVAC Unit 4 Upgrades	GPP	126K
UST Compliance	OE	268K
OSHA Regulatory Compliance - RAC 3 Electrical Upgrades	OE	77K
OSHA Regulatory Compliance - Machine Guarding Upgrades	OE	16K
OSHA Regulatory Compliance - Building Grounding Upgrades	OE	32K
ORNL Storm Drainage Systems Modification	OE	136K
Total		
		\$2,324K

<sup>5</sup>Actual FY 1997 KC Program cost is primarily for ES&H infrastructure upgrades activities.

Activity	Type	Cost
Replace CFC Chiller - Building 6000N	GPE	\$ 458K
Replace CFC Chiller - Building 6000S	GPE	392K
Replace UST - Building 3130	GPE	145K
Replace UST - Building 7931	GPE	223K
Replace UST - Building 7921	GPE	136K
Replace UST - Building 7901	GPE	97K

Replace UST - Building 2572	GPE	114K
Replace UST - Building 1505	GPE	126K
Replace UST- Building 4514	GPE	101K
Replace CFC Chiller - Building 4509 Unit 4	GPE	779K
Replace Chiller - Building 3025	GPE	44K
Replace Chiller - Building 7900	GPE	87K
Conveyor - Building 7001	GPE	26K
Bottom Discharge Dumpster Truck	GPE	3K
Rehabilitate Steam Stack	GPP	641K
Rubb Tent for Coal Yard Treatment Facility	GPP	30K
Total		
		\$3,402K

<sup>6</sup>One FY 1997 EX-31/EW-20 Program funding activity was completed.

Activity	Type	Cost
Building 7001 Modifications	GPP	\$132K
Total		
		\$132K

The OESH Directorate performs a large portion of the indirect ES&H activities, and ORNL is committed to ensuring that budget reductions do not result in significant increases in risk to the environment or to the safety and health of the workers or the public. An important task of the indirect cost reduction effort is the introduction of more cost-effective approaches to ES&H management and service delivery. A current ES&H reengineering effort is examining inefficiencies and nonessential functions and is expected to provide a means for ES&H activities to function more effectively at reduced cost.

#### **6.4 FY 1997 ES&H ABATEMENT PERFORMANCE**

Several key abatement issues were addressed through the FY 1999 ES&H Budget Formulation Submission for FY 1997. ADSs were included in the submission to address the key issues; however, many of those ADSs were noted as unfunded because of existing resource expectations and constraints. Unfunded issues were individually evaluated to assure

that H&S of the public and site employees and environmental resources were protected. The limited ORNL budget resources were distributed based on this evaluation to assure that administrative or other compensatory measures are in place to address ES&H risks, even though full funding is not available to eliminate the risk.

ORNL possesses one of the oldest physical plant facilities within the DOE system. About one-third of ORNL's total existing buildings are over 40 years old, and DOE capital expenditures to upgrade and replace ORNL facilities have been only a small fraction of those of normal industrial practice. Thus, ORNL has accumulated a substantial legacy of ES&H problems for correction. The existing buildings, utilities, and equipment require substantial maintenance cost to ensure reliability to continue R&D efforts in an environmentally and worker-safe condition. An Infrastructure Management Plan (IMP) process has been initiated at ORNL to provide a means of reporting infrastructure planning and budgeting information in an integrated, efficient, timely, and consistent manner that will support ORNL and DOE budgetary needs and requests. Many infrastructure activities may have an impact on the environment and on the safety and health of site workers and the public. Similarly, ES&H requirements and needs drive many infrastructure activities. Many infrastructure activities identified in the development of the FY 1999 ORNL Site IMP were driven by ES&H needs.

Key abatement issues are noted below.

#### **Underground Storage Tank Compliance (GPE)**

This activity replaced, upgraded, or closed underground storage tanks (USTs) to comply with federal and state UST regulations. Failure to comply would have resulted in penalties of \$10K per day per out-of-compliance tank and/or imprisonment. Activity on the USTs at Buildings 2521, 3130, 7931, 7921, 7901, 2572, and 1505 was completed during FY 1997. Work on the UST at 4514 was budgeted in FY 1997. The work is 90% complete and is scheduled for completion in December 1997. No additional capital funding is required for this project.

#### **Underground Storage Tank Compliance (KG-OE)**

This funding is carryover funding from FY 1996 that supports land farming of soil, waste disposal, analytical services, geological subcontract support, program management, and project management. It provides for the disposal of soils and residues from the various tank removals/remediations and monitoring of UST sites prior to state approval of remediation activities. This work is on schedule and projected to be completed by December 1998.

#### **CFC Phaseout - Clean Air Act Compliance (GPE)**

This activity replaced air-conditioning equipment using Class I ozone-depleting refrigerants (CFCs). Production of CFCs is being phased out in compliance with the requirements of the Clean Air Act. Failure to implement this activity would have resulted in the shutdown of some research facilities due to the unavailability of replacement CFC refrigerants, which would impact ORNL's ability to accomplish site missions. Replacement of chillers at Buildings 7920, 4509 (units 1 through 4), 6000N, and 6000S was completed during FY 1997. Work on the chiller at Building 3025, originally planned for FY 1997, is being deferred until FY 1999 due

to changes in the proposed method of accomplishment. This chiller will be procured in FY 1998 and installed early in FY 1999 after the cooling season is over. This deferral will not adversely impact the compliance status of ORNL since adequate CFC refrigerant is available to support operation of this chiller through FY 1999.

### **HVAC Upgrades, ORNL at Y-12 (GPP)**

This activity replaced a deteriorated HVAC direct exchange unit in Building 9201-3 at Y-12. The existing equipment had exceeded its life expectancy and was unreliable and expensive to maintain. In addition, replacement of the emergency generator for the Building 9210 HVAC system was completed. Due to the live animal research in these buildings, replacement of this equipment had significant H&S and mission impacts. All activities are complete.

### **Rehabilitate Steam Plant Stack (GPP)**

This project refurbished the seriously deteriorated radial brick stack at the steam plant by replacing the stack liner and the top 64 feet of the stack. The stack became a significant and immediate safety hazard as a result of bulging and severe cracking. The top 20 feet of the stack was removed in September 1996, and a temporary retaining corset was installed 40 feet down from the new top of the stack. This work, which was originally planned for FY 1998, was expedited and completed in FY 1997 due to the serious deterioration found in late FY 1996.

### **Comprehensive Sink and Drain Survey (OH)**

During FY 1997, the OEP and ORNL Central Management managed and coordinated the completion of the ORNL comprehensive sink and drain survey of site-wide connections to the ORNL storm-drain network. Any inappropriate connections to the storm drain system were isolated and either rerouted or disconnected. Over 800 facilities were surveyed. An FTE labor estimate of \$1.5M was spent to perform the survey. This represented approximately \$2.0M savings in work activity accomplishment from subcontractor estimates. This action greatly reduced the possibility of illegal discharges, and their accompanying liability, under the Clean Water Act and enhanced ORNL compliance to its National Pollutant Discharge Elimination System (NPDES) permit.

### **ORNL External Dosimetry Program (OH)**

A significant radiological issue abated in FY 1997 was the recertification of the ORNL External Dosimetry Program by the DOE Laboratory Accreditation Program (DOELAP). The original program was a centralized system comanaged by LMES. The recertification due this year was the first time that ORNL had the opportunity gain certification as a separate entity. Certification was granted with no findings and only minor concerns. All activities for recertification were completed in FY 1997 with existing Laboratory overhead funding allocation. A dosimetry system upgrade project was approved for FY 1998 for \$170K in GPE funding. The upgrade will procure new dosimetry readers to assure that state-of-the-art equipment is used for personnel safety.

### **OSHA Regulatory Compliance, RAC 3 Electrical Upgrades (KG-OE)**

This funding is carryover funding from FY 1996. It is utilized to correct RAC 3 electrical noncompliances in ORNL facilities. Corrections were accomplished in 3503, 3508, and 7920. The balance of available funding, approximately \$11K, will be utilized for additional corrections in FY 1998.

### **OSHA Regulatory Compliance, Machine Guarding (KG-OE)**

This funding is carryover funding from FY 1996. It is utilized to correct machine guarding deficiencies at ORNL facilities. In FY 1997, the funding provided for locked access to the attic areas of 4500N and 4500S to control exposure to unguarded fan belts, etc. This funding was supplemented with \$15.2K of Laboratory overhead funding in FY 1997 to cover the total cost of the 4500N and 4500S work. The work was approximately 95% complete at the end of FY 1997.

### **OSHA Regulatory Compliance, Correct RAC 3 Building Grounding (KG-OE)**

This funding is carryover funding from FY 1996. It is utilized to correct building grounding deficiencies in ORNL facilities. Grounding deficiencies in Buildings 2506 and 3503 were corrected with this funding in FY 1997. Only 85% of this work was completed with KG02 funding. Laboratory overhead funding of \$6.3K was allocated to complete this task.

### **ORNL Storm Drain Modifications (KG-OE)**

This funding is carryover funding from FY 1996. It was utilized to remove 3 outfalls from the NPDES permit, perform "end of pipe" work at 15 locations, and install 3 sampling wells, 800 NPDES signs, and 3 dechlorinators on outfalls at the ORNL site. All funding for this project was expended in FY 1997.

#### **6.4.1. Treatment of Key Abatement Issues**

Frequently, research activities are improperly or inadequately addressed in applicable regulations and DOE orders. However, compliance with ES&H regulations, orders, and procedures is the responsibility of ORNL line management. Excellence in ES&H is achieved through close cooperation with the ES&H professional and technical staff members.

An ADS describes each ES&H activity, associated milestones, risk of not implementing or continuing activity, and activity funding requirements and funding sources. Risk-based ranking of programs and activities was performed to ensure that activities providing the highest-risk benefit were funded from the limited pool of funding resources.

## **6.5 FY 1997 UNFUNDED COMPLIANCE AND IMPROVEMENT ACTIVITIES**

Following allocation of the FY 1997 overhead budget funding and acknowledgment of the funded Field Work Proposal Request, the following were identified as the top ten unfunded ADSs (Appendix G, Table G.6). Based on risk score prioritization, only the first ADS (A95D0037) is listed as a compliance issue; the remaining are improvement issues. Core program funding met necessary compliance requirements; however, funding needs were identified to improve activities. In some cases, funding may have been reallocated during FY 1997 to accomplish all or parts of tasks identified in the ADSs.

A95D0037, Facility Safety Documentation - Safety Analysis Reports Update Program (SARUP)

The most significant unfunded ADS is for ORNL facilities requiring safety documentation upgrades (Buildings 2026, 3025E, 3027, 3019, 5505, 7900, 7920, 7930). The upgrades would comply with DOE Orders 5480.22 and 5480.23 and the associated pending Price-Anderson rules 10 CFR 830.110 and 830.320 for the development of Safety Analysis Reports and Technical Safety Requirements. To fully fund the upgrades over a six-year period would require approximately \$12 million. A special allocable cost pool identifier “BC” means that the burdened cost would be accountable to the facility operations identified in the ADS Milestones and Accomplishments section of the subject ADS.

C97D0026, Water Monitoring NPDES - Programming

Upgrades and improvements to the Environmental Monitoring Management Information System (EMMIS), the software system used for sample tracking, data management, and reporting for NPDES Permit monitoring, were not covered in the Office of Environmental Protection’s target overhead budget. These funds would have supported personnel for programming services. The overall NPDES task included sampling, analysis, data management, quality assurance, and reporting for water monitoring programming upgrades required by the ORNL NPDES Permit. Subtask programming was for facility effluents, ambient streams, storm water outfalls, and the monitoring plans for radiological parameters, mercury, and polychlorinated biphenyls (PCBs).

C97D0030, Upgrade/Replace Accident Dosimeter System

Needs for upgrading the accident dosimetry system at ORNL were identified. This request would have identified appropriate upgrade/replacement requirements for the current nuclear accident dosimetry system. In addition, the request would have funded the system acquisition, conducted the necessary performance tests, developed procedures, and implemented the system for routine use.

C97D0040, Emergency Equipment Upgrade

Needs for upgrading the emergency public address system at ORNL were identified. This request would have replaced outmoded and potentially unreliable public address (PA) components, resulting in increased assurance of operation.

A96D0001, Natural Phenomena Hazards Mitigation

Additional funding was requested to perform necessary activities to achieve requirements of DOE Order 5480.28, Natural Phenomena Hazards Mitigation, and related Executive Order 12941. Both requirements documents cover earthquake, wind, and flood considerations for workers and the public.

K95D0028, Compliance Assurance Program

Additional funding was requested for administrative actions for a projected addition of nine rules that could be issued under the requirements of the Price-Anderson Amendments Act. Compliance Assessments and Implementation Plans based on coordination with line management and responsible Functional Policy Managers need to be created and submitted to DOE. Impact assessments as well as funding requests, when necessary, will need to be developed.

A96D0002, Nuclear Criticality Safety Program

The purpose of this ADS for the NCS Program was to provide an additional subcontracted engineer to address a projected manpower shortfall in the current NCS Section staff. It was projected that ORNL facilities would require increased support to meet requirements of DOE Order 5480.24 and DOE Order 420.01 when promulgated.

C97D0107, Relocation of Life Sciences Division Laboratories at Y-12

Life Sciences Division laboratories in Building 9207 at the Y-12 site have not received adequate maintenance support from Y-12 over the last several years, resulting in substantial deterioration of work areas and significant increased risk to personnel and projects as well as impacting ability to accomplish their research mission. Since repairs and upgrades would be prohibited by excessive cost, an urgent need exists for funds to move laboratories out of 9207 to another site as soon as possible, preferably to X-10 or another suitable off-site area.

C97D0037, Emergency Preparedness Exercise

Additional funding needs were identified for the preparation of an Emergency Preparedness Exercise for Full Participation required by DOE Order 151.1. The exercise is scheduled to be conducted in the spring of CY 1998. ORIG 5500.3B specifies extensive preparatory actions to be taken.

C97D0033, ES&H Quality Administration Functions

Additional funding needs were identified to provide for ES&H administration within the quality administration functions for RCRA compliance, hazard communications, radiation safety, environmental protection, and emergency preparedness in radiography.

## **6.6 ORNL SUPPORT OF DOE STRATEGIC GOALS FOR ES&H**

DOE ES&H Goal 1: "By 1996, the DOE community has substantially empowered workers and taken other necessary actions to prevent all serious injuries and all fatalities, and to eliminate all worker exposures and environmental releases in excess of established limits. By eliminating these exposures and releases, we shall reduce the incidence of illness among workers and the public, and prevent damage to the environment."

Funding full compliance to ES&H requirements in support of the site's missions within an environment of decreasing budgets continues to be a challenge to ORNL. However, ORNL supports achievement of the *DOE Strategic Plan* goals. ES&H programs continue to focus on the responsibility and accountability of workers to address program goals and to achieve full compliance with N&S ES&H requirements. By ORNL Management Directive, no employee is required to participate in work believed by the employee or others to be a threat to worker safety or health or the environment. All ORNL workers are empowered with stop-work authority to halt any work considered a serious threat to the safety and health of personnel or the environment. To ensure the inclusion of all levels of employees, bargaining units have full-time personnel assigned to the OSHP to ensure awareness of and direct input to ES&H concerns and to assist in performing ES&H assessments.

DOE ES&H Goal 2: "By 1996, there will be specific environment, safety, and health performance requirements for DOE activities which will be the basis for measuring progress toward continuous improvement."

ORNL's goal is to establish effective measurement of performance systems and to maintain and monitor continuous improvement progress in ES&H. ORNL has implemented the ES&H Oversight Reduction Program to reduce ES&H costs while maintaining or improving ES&H performance. Integral to this program is the establishment of specific performance measures that focus on positive performance improvement. The performance measures, developed jointly by ORNL and DOE personnel, include criteria that are objectively measurable and allow for meaningful trends.

Additionally, throughout FY 1998, ORNL will utilize its Performance Indicator Program designed to drive improvement and characterize progress toward meeting each performance measure. Performance indicators are designed to be tools used by ORNL ES&H managers, division directors, and senior management to aid in the assessment of the performance of a particular program or functional area. These programs, along with an aggressive structure of compliance assessments, will support the continuous improvement of worker safety and health and environmental protection.

DOE ES&H Goal 3: "By 1996, DOE will establish clear environment, safety, and health priorities and manage all of its activities in proactive ways that effectively and significantly increase protection to the environment and to public and worker safety and health."

During FY 1998, ORNL ES&H priorities will be established through the use of an accepted, risk-based prioritization method. Risk-based prioritization ensures that the most risk-significant ES&H programs and activities are given primary consideration for funding and implementation. It also ensures that management is fully aware when sufficient funding is not

available to accomplish ES&H programs and activities so that alternative methods for funding or for resolving risk-significant issues may be identified.

The ADSs contained in ORNL's annual ES&H Budget Formulation Submission address the ES&H program structure and methods of protecting the environment and worker safety and health at ORNL. The ES&H Budget Formulation Submission supports planning, budgeting, and allocating resources for ES&H activities and programs. It serves to focus significant management attention on those ADSs that will be funded within target funding levels, as well as on ES&H activities that are unfunded or underfunded as a result of resource constraints. The ES&H Budget Formulation Submission is reviewed and approved by ORNL senior management prior to submittal to DOE. ORNL ES&H strategic plans and internal implementation plans are monitored by the ESHQC.

DOE Goal 4: "Before 1996, we will demonstrate respectable performance related to environmental protection and worker/public safety and health. Related DOE information will be reliable, comprehensive, and available through an open process. As a result, we have earned public credibility."

ORNL is continually improving ES&H programs and reporting mechanisms to ensure sharing of information, lessons learned, tracking and trending, and accomplishment of corrective actions. Information contained within this plan illustrates efforts ORNL is making towards ES&H performance improvements. Specific information concerning performance indicators and achievements, progress towards resolution of significant ES&H issues, and progress towards implementation of ES&H programs and activities is contained herein. ORNL also maintains systems to demonstrate ES&H performance by tracking hazardous materials, focusing on pollution prevention, and implementing new and reliable methods of waste storage and disposal.

The agreement-in-principles established between the DOE and the state of Tennessee and the resources dedicated to those agreements by ORNL management are evidence of the efforts to earn public trust and credibility. As a result of the HSA, the TOA, and the Human Experiments Studies, hundreds of documents have been released for public view. Most of the classified documents generated at ORNL over the last 50 years have recently been declassified.

## **7. FY 1998 ES&H EXECUTION PLAN AND ISSUES**

### **7.1 BUDGET ANALYSIS AND IMPACTS**

A listing of ORNL ES&H ADSs for FY 1998 with known target and supplemental requests is included in Appendix H, Table H.1.

### **7.1.1 Major Planning Assumptions**

Planning assumptions are based on direct guidance from the Cognizant Secretarial Offices (CSOs) funding programmatic activities at ORNL. In addition, DOE-ORO funding guidance is followed to assure consistency of field work proposals (FWPs), ADSs, Capital Equipment Requests, GPP Requests, and Line Item Requests. All overhead planning assumptions are based on a prioritization of risk to the mission of ORNL, personnel safety and health, environmental issues, and public issues. ORNL is dedicated to assuring that all regulatory requirements are at least met. Reductions in funding may impact compliance with some of the requirements of DOE orders and may severely impact implementation of best management practices (BMPs).

### **7.1.2 Funding Bases**

The Secretarial Office responsible for Landlord activities at ORNL is Energy Research (ER), Office of Basic Energy Sciences (BES). With the exception of activities funded directly by the Office of Environmental Restoration and Waste Management Program (EM), all direct funding allocated to ORNL by ER and other programs is recognized within the ES&H Management ADS submittals. Where cost is escalated on an ADS included in this plan, a cost escalation rate of approximately 3.2% for labor and materials is used.

For each ADS submitted in the FY 1999 ES&H Management Plan, ES&H activities are designated as either direct (Program) funded or indirect funded from a variety of allocable cost pools. ORNL ES&H activities to be direct (Program) funded are identified as either target (funded) or unfunded with the appropriate Resource Structure Code and budget and reporting (B&R) code specified. The allocable cost pools include the site overhead pool (OH) and division-specific overhead pools (DA). Other allocable cost pools which may be designated are distributed accounts through service organizations (DI), burdened accounts supported by a specific division (BC), and centralized accounts (PD). Each ADS to be funded from these allocable cost pools is identified as either target or unfunded and includes identification of the associated funding pool.

All indirect funded ORNL ES&H offices (e.g., OEP) recognize their cost of operation through target ADSs for which the costs correspond directly with the ORNL overhead budget documents. Unfunded activities corresponding with the ORNL overhead budget are recognized as "Supplemental." Direct programmatic funding requests by the ORNL ES&H organizations are submitted through FWPs with associated ADSs submitted to ER. The FWP submittals working in concert with the ADS submittals allow both the overhead organizations and the programmatic organizations to request Landlord direct funding for ES&H activities.

Current ES&H funding targets were developed as part of the FY 1998 ORNL Site overhead budgeting process. Following risk prioritization of activities, recommendations were made to ORNL management for funding of targets and consideration for the funding of supplemental requests. ORNL management then allocated available target funding to ES&H organizations for their activities. Overhead funding is reviewed by DOE Site personnel for

concurrency. Following adjustments, ES&H organizations were allocated the available funds to support the highest ranked activities. Adjustments of funded programs are made during the fiscal year based on risk prioritization and management approvals. In addition to the site overhead process, programmatic organizations support intradivisional ES&H activities through a division-specific overhead structure. This funding is controlled by line management to ensure internal compliance to ES&H requirements.

### **7.1.3 Impact of Potential Budget Reductions**

Significant reductions in funding for labor, materials, and services affecting ORNL ES&H programs have recently occurred. Further reductions are likely and could result in the elimination or reduction in scope of various ES&H programs and activities. The most significant impacts will likely be on the ADSs associated with the lowest ranked activities and programs to which target overhead funding has been allocated in the plan.

Following the final allocation of functional area indirect budgets, it is anticipated that budget reductions would likely result in the deferral or reduction in scope of the following activities. More significant budget reductions would begin to affect core ES&H programs (indirect funded) necessary to accomplish ORNL's missions and maintain current levels of regulatory compliance.

Environmental Program Management Oversight - Activities in this function provide regulatory analysis and interpretation of environmental issues. They further provide for the development and maintenance of environmental information systems.

Data Transfer to OREIS Database - Compile and prepare environmental sampling data for transfer to the Oak Ridge Operations Office Environmental Information System (OREIS) database.

Intercomparison Studies - These programs have been implemented as a recommendation of ANSI N 13.30 *Performance Criteria for Radiobioassay*: in vitro urinalysis program, the external QC program for in vitro bioassay (urinalysis); in vitro fecal program, the external QC program for in vitro bioassay (fecal analysis); in vivo program, the external QC program for in vivo bioassay.

Assessment Program Functional Support - This activity facilitates implementation of the Laboratory Assessment Program Plan through the functional disciplines embodied in three groups: the Technical Audit Group (TAG), the Corrective Action Support Staff (CASS), and the Audit Logistics Group.

ORNL Assessment Program - This activity provides for the development of a coordinated and integrated system of continuous improvement that encompasses all activities at ORNL.

ORNL Audit Center - This activity facilitates implementation of the Laboratory Assessment Program Plan through operation of an audit center. All logistics details pertaining to support of an external or internal assessment team are within the purview of the audit center manager.

## 7.2 FY 1998 ES&H INDIRECT BUDGET SUMMARY

Planned ES&H indirect expenditures (Laboratory Overhead) for FY 1998 are as follows:

ES&H Indirect (Laboratory Overhead)	FY 1998 Planned Indirect Target	FY 1998 Revised
Office of Environmental Protection CA - Protection of Air Quality CW - Protection of Water Quality HW - Solid and Hazardous Waste (Oversight Only) CS - Control of Toxic Substances MR - Environmental Management, Oversight, and Reporting PP - Pollution Prevention Oversight	\$5,395K	\$5,096K
Health Division MS - Occupational Medical Services	2,685K	2,272K
Office of Laboratory Protection EP - Emergency Preparedness FP - Fire Protection Engineering	2,354K	2,380K
Office of Safety and Health Protection and Office of Nuclear Safety IS - Industrial Safety IH - Industrial Hygiene NS - Nuclear Safety TS - Transportation Safety MO - Management and Oversight	6,306K	6,105K
Office of Quality Services MR - Environmental Management, Oversight, and Reporting MO - Safety Management and Oversight	1,996K	2,112K
Office of Radiation Protection RP - Radiation Protection	4,197K	4,477K
Waste Management Operations	683K	608K

ES&H Indirect (Laboratory Overhead)	FY 1998 Planned Indirect Target	FY 1998 Revised
Other Overhead <sup>1</sup> - OSHA Compliance, RAC3 Nonelectrical (\$95K) - OSHA Compliance, RAC 3 Electrical (\$88K) - Lead Shop Upgrade (\$42K) - General ES&H (\$42K)		267K
Total FY 1998 Indirect	\$23,616K <sup>2</sup>	23,317K <sup>3</sup>

Not all indirect (overhead) funding allocations are included in the above table. Some organizations receive Laboratory overhead funds which are not wholly dedicated to ES&H activities; however, the activities may have a specific supporting role to ES&H (e.g., transportation activities, the Tennessee Oversight Agreement, ES&H Management Planning).

<sup>1</sup>These overhead funds were authorized for allocation to activities that were previously funded through KG02. No indirect funded ADSs exist for these projects, although the scope of work was previously included in the KG02 direct funded ADSs, which are currently unfunded.

<sup>2</sup>FY 1998 target indirect ADSs are listed in Appendix H, Table H.2. FY 1998 unfunded indirect ADSs are listed in Appendix H, Table H.3.

<sup>3</sup>Revision to FY 1998 target indirect ADSs following the FY 1998 budget review. The FY 2000 Budget Formulation Plan will reflect the revised overhead budget.

### 7.3 FY 1998 ES&H DIRECT BUDGET SUMMARY

The following is a listing of planned FY 1998 direct costs (Appendix H, Table H.4) and revised funding targets following reconciliation of FWP and ADSs.

Program	FY 1998 Planned Direct Target	FY 1998 Revised Direct Target
DA Activities <sup>1</sup> (Appendix H, Table H.4.1)	\$ 6,961K	\$ 6,961K
DI Activities <sup>2</sup> (Appendix H, Table H.4.2)	15,681K	15,681K
HFIR Safety Operating Cost <sup>3</sup> (Appendix H, Table H.4.3)	12,196K	12,196K
KG Program Cost <sup>4</sup> (Appendix H, Table H.4.4)	0K	841K
KC Program Cost <sup>5</sup> (Appendix H, Table H.4.5)	7,500K	5,915K
Total (Appendix H, Table H.4)	\$42,338K	\$41,594K

<sup>1</sup>From the direct target ADSs in the FY 1999 Budget Formulation Plan submittal, \$6,961K was designated spending by R&D divisions and programs from their division programmatic funds in support of ES&H needs. These activities included support for internal division personnel with dedicated ES&H roles (e.g., division safety officer) and other expense activities such as the correction of safety shower and eyewash station deficiencies. In addition, direct target funds reported were from expected funding to support projects and activities with an identifiable percentage for ES&H support as well as infrastructure support. Direct unfunded ADSs will be identified in the FY 2000 Budget Formulation Plan submittal. Unfunded items are continually being reviewed to determine if funding allocations need to be adjusted to allow for completion of these activities.

<sup>2</sup>From the direct target ADS C97D0148 in the FY 1999 Budget Formulation Plan submittal, \$15,681K was designated as planned distributed cost incurred by the ORP for services procured by other ORNL divisions/offices/programs.

<sup>3</sup>HFIR operating cost is the total operating cost of \$12,196K on ADS E93D0021, "High Flux Isotope Reactor Operation." This funding recognizes some costs for ES&H-related activities which would be funded through the Basic Energy Sciences Program activities. The specific ES&H activities for HFIR operations were not separated from the total operating costs. For the FY 2000 Budget Formulation Plan submission, only those costs that are specifically ES&H-related will be recognized.

<sup>4</sup>Revised planned FY 1998 KG direct target costs include the following:

Activity	Type	Cost
CFC Chiller, 7920 (Close out)	GPE	\$ 13K
Form Roller, Building 7012	GPE	35K
Replace Primary Transformer - 7901 Area	GPE	\$374K
3000 Area Water Isolation Valves	GPP	273K
UST Compliance	OE	135K
OSHA Regulatory Compliance, RAC 3 Electrical	OE	11K
Total		\$841K

<sup>5</sup>Revised planned FY 1998 KC direct target costs include the following:

<b>Activity</b>	<b>Type</b>	<b>Cost</b>
Replace Primary Transformer - 7901 Area	GPE	\$ 90K
Replace UST - Building 7931 (Close out only)	GPE	15K
Replace CFC Chiller, 4509 Unit 6	GPE	775K
Replace CFC Chiller - Building 6000N (DDC Controls)	GPE	67K
Replace CFC Chiller - Building 3025 (Procurement only)	GPE	125K
Replace CFC Chiller- Building 6000S (DDC Controls)	GPE	38K
Replace CFC Chiller - Building 7900	GPE	878K
Conveyor System Upgrade - Building 7001	GPE	324K
Replace UST - Building 4514	GPE	91K
Bottom Discharge Dumpster Truck	GPE	94K
Replace CFC Chiller 7930	GPE	550K
Replace CFC A/C Units - Sitewide	GPE	500K
Trash Truck, Compactor	GPE	170K
Aerial Work Platform	GPE	52K
Emergency Response Vehicle	GPE	110K
Electric Personnel Lift	GPE	30K
Dosimetry System Upgrade	GPE	170K
Safety Valve Test Stand	GPE	113K
69 kV Forward Bucket Truck	GPE	160K
Dechlorination System	GPE	132K
Rubb Tent for the Coal Yard Treatment Facility	GPP	111K
Upgrade HVAC - Building 9210 Unit 4	GPP	320K
3000-SCFM Compressor - Building 2519	GPP	\$1,000K
Total		\$5,915K

Note: Open direct unfunded ES&H ADSs are listed in Appendix H, Table H.5.

## **7.4 FY 1998 PLANNED ES&H ABATEMENT ACTIVITIES**

### **Underground Storage Tank Compliance (GPE)**

This activity will complete replacement of a UST at Building 4514 to comply with federal and state UST regulations. Failure to comply would have resulted in penalties of \$10K per day per out-of-compliance tank and/or imprisonment. Completion of this UST will complete the original scope of the project.

### **Underground Storage Tank Compliance (KG-OE)**

This funding is carryover funding from FY 1996 that supports land farming of soil, waste disposal, analytical services, geological subcontract support, program management, and project management. It provides for the disposal of soils and residues from the various tank removals/remediations and monitoring of UST sites prior to state approval of remediation activities. This work is on schedule and projected to be completed by December 1998.

### **CFC Phaseout - Clean Air Act Compliance (GPE)**

This activity will replace air-conditioning equipment using Class I ozone-depleting refrigerants (CFCs). Production of CFCs is being phased out in compliance with the requirements of the Clean Air Act. Failure to implement this activity would have resulted in the shutdown of some research facilities due to the unavailability of replacement CFC refrigerants, which would impact ORNL's ability to accomplish site missions. Replacement of chillers at Buildings 7900 and 7930 will be completed during FY 1998. Direct digital controls will be installed on chillers previously replaced at 6000N and 6000S. Additionally, smaller HVAC systems utilizing CFC-1 will be replaced in Buildings 2001, 2013, 2018, 3017, 3025E, 3550, and 4500N. Work on the chiller at Building 3025, originally planned for FY 1997, is being deferred until FY 1999 due to changes in the proposed method of accomplishment. This chiller will be procured in FY 1998 and installed early in FY 1999 after the cooling season is over. This deferral will not adversely impact the compliance status of ORNL since adequate CFC refrigerant is available to support operation of this chiller through FY 1999.

### **HVAC Upgrades, ORNL at Y-12 (GPP)**

This activity will replace HVAC Unit #4 in Building 9210 at Y-12. The existing equipment has exceeded its life expectancy and is unreliable and expensive to maintain. Due to the live animal research in these buildings, replacement of this equipment has significant H&S and mission impacts.

### **ORNL External Dosimetry Program (OH)**

A significant radiological issue abated in FY 1997 was the recertification of the ORNL External Dosimetry Program by the DOELAP. The original program was a centralized system

comanaged by LMES. The recertification due this year was the first time that ORNL had the opportunity to gain certification as a separate entity. Certification was granted with no findings and only minor concerns. All activities for recertification were completed in FY 1997 with existing Laboratory overhead funding allocation. A dosimetry system upgrade project was approved for FY 1998 for \$170K in GPE funding. The upgrade will procure new dosimetry readers to assure that state-of-the-art equipment is used for personnel safety.

### **OSHA Regulatory Compliance, RAC 3 Electrical Upgrades (KG-OE)**

This funding is carryover funding from FY 1996. It is utilized to correct RAC 3 electrical noncompliances in ORNL facilities. The balance of available funding, approximately \$11K, will be used for additional corrections in FY 1998. Additionally, \$100K of overhead funding is being committed to this activity (overhead).

### **OSHA Compliance, RAC 3 Nonelectrical (OH)**

This funding will provide for the replacement of the pedestrian bridge at Building 9201-3.

### **Lead Shop Upgrade (OH)**

This funding will provide for ventilation upgrades at the Lead Shop.

### **Replace Primary Transformers, 7901 Area (KC and KG-GPE)**

This project will provide for the replacement of four transformers serving the HFIR facilities. These electrical devices provide electrical power to the HFIR facilities. Despite excellent preventive maintenance, problems related to age, safety, and system operability and reliability have developed. The system replacements will provide a safer, more modern, reliable electrical distribution and supply system for the HFIR facilities.

### **3000 Area Water Isolation Valves (KG-GPP)**

This funding provides for the completion of the project initiated in FY 1995. Remotely operated valves are being installed in seven locations in the 3000 Area of ORNL to permit rapid response to waterline leaks to minimize any potential environmental impacts.

### **Rubb Tent for the Coal Yard Treatment Facility (KC-GPP)**

This project will provide a Rubb tent structure to enclose the Coal Yard Runoff Treatment Facility, which will permit uninterrupted operations during extremely cold weather, decreasing the likelihood of unpermitted NPDES excursions.

### **3000-SCFM Compressor, Building 2519 (KC-GPP)**

This project will provide for the purchase and installation of a new 3000-scfm rotary screw turbine-type oil-less air compressor to replace two aging units at Building 2519. Clean, oil-free compressed air is used throughout the Laboratory to control equipment, systems, and processes and is a critical utility in the operation and maintenance of the Laboratory.

### **Dechlorination System (KG-GPE)**

This project will replace the chlorine system presently being used at the ORNL Sewage Treatment Plant (STP) to disinfect the effluent. As originally scoped, a dechlorination system was to be installed, but after some investigation, it was learned that an ozonation system could be purchased and installed for little more cost than the dechlorination system. The ozone system disinfects as well as chlorine, eliminates the use of a hazardous chemical (chlorine), has no residual in the effluent after a short time, and requires less operational and maintenance time than a chlorination/dechlorination system. The project will facilitate compliance with NPDES permit requirements.

## **7.5 FY 1998 UNFUNDED COMPLIANCE ACTIVITIES**

Based on risk prioritization scores, the following are the top ten unfunded ADSs which were submitted in FY 1997 ADSs for the FY 1999 Budget Formulation Document (Appendix H, Table H.6). Each of the ADSs identified activities which have direct compliance impacts. Significant changes to the compliance ADSs are expected in the FY 2000 Budget Formulation Document, which will be submitted April 1998. Therefore, these ADS may not remain as the top ten unfunded ADSs for FY 1998.

### A95D0037, Facility Safety Documentation - Safety Analysis Reports Update Program (SARUP)

The most significant unfunded ADS is for ORNL facilities requiring safety documentation upgrades (Buildings 2026, 3025E, 3027, 3019, 5505, 7900, 7920, 7930). The upgrades would comply with DOE Orders 5480.22 and 5480.23 and the associated pending Price-Anderson rules 10 CFR 830.110 and 830.320 for the development of Safety Analysis Reports and Technical Safety Requirements. To fully fund the upgrades over a six-year period would require approximately \$12 million. A special allocable cost pool identifier "BC" means that the burdened cost would be accountable to the facility operations identified in the ADS Milestones and Accomplishments section of the subject ADS.

### C97D0099, Compliance with Revised NPDES Limits

ORNL NPDES Permit renewal included effluent limits that may be met by physically combining existing NPDES outfalls X01 (Sewage Treatment Plant) and X02 (Coal Yard Runoff Treatment Facility) and possibly other outfalls. Combining outfalls may allow effluent constituent and receiving-stream impacts to be moderated such that permit limits would be in compliance. This activity would involve hard piping, excavation work, and installation of

pumps and other related components. The result would be improved capability to comply with NPDES permit limits and reduced level of effort and cost for toxicity testing, environmental sampling, and laboratory analysis required under NPDES.

A95D0032, ORNL H&S - Radiological/Toxicological Sabotage

DOE Notice 5630.3A, "Protection of Departmental Facilities Against Radiological and Toxicological Sabotage," was made applicable to ORNL by inclusion of Oak Ridge Order 151.1, dated 9/30/96, in the baseline. The order requires contractors to perform graded assessments of the risk due to sabotage with the level of hazards present in their facilities. Significant milestones would be to identify and rank hazardous materials targets, perform vulnerability assessments of credible threat and target combinations, evaluate sabotage risk reduction options, and select and implement prevention and mitigation options.

A93D0041, ORNL Nuclear Criticality Safety (NCS) Upgrade

DOE Order 5480.24 has been issued and has expanded NCS requirements. In addition, a new DOE Order (420.01) has been issued which increases the number of mandatory ANSI/ANS Standards. The activities of this ADS are necessary to extend the core NCS program guidance and support to bring ORNL into compliance with these requirements.

C97D0144, ORNL Safety and Health - OSHA Regulatory Compliance

ORNL's goal of identifying and correcting all serious OSHA noncompliances (RAC 1s and RAC 2s) and 100% of all previous other-than-serious noncompliances (RAC 3s) has resulted in compliance funding requirements far beyond that which current programs can fund. Funding is not available to address large OSHA noncompliance issues. This activity is proposed to upgrade ORNL facilities and programs to achieve compliance with OSHA standards. The primary areas requiring the enhanced support are (1) continued assessment of OSHA noncompliances to evaluate and select compliance alternatives and define and prioritize abatement plans and (2) corrective actions for noncompliances with emphasis on serious and medium-risk noncompliances. A past survey identified OSHA noncompliance issues. Since that time, continued inspections and recent surveys have specifically identified and quantified many noncompliances by sub-part. Significant additional out-year expense and capital funding will be required to provide upgrades of ORNL facilities and programs to a level of worker health and safety equivalent to OSHA requirements. In addition, programs would be established to ensure the maintenance of this level of worker safety and health protection. Specific project descriptions and milestones are included in Sections 26 and 28 of ADS C97D0144.

C97D0074, Fire Systems Upgrade, ORNL at Y-12

Older ORNL facilities at Y-12 have served various occupancies and research projects. Less reliable sprinkler systems are in place to protect selected portions of these facilities. Both

preaction- and deluge- (open-head) type sprinkler systems, which are maintenance intensive and substantially less reliable, were utilized for earlier occupancies and are still in use. As research emphasis shifted and occupancies changed, these systems were not updated to more reliable and minimum maintenance wet-pipe systems. Other fire systems upgrades include removal of exhaust fans, installation of fire barriers and louvers in duct systems, replacement of fire doors, replacement of illuminated exit and emergency signs, installation of emergency lighting, and installation of fixed fire suppression equipment in some of the walk-in cold rooms.

Plans are in place to relocate ORNL at Y-12 facility operations to the ORNL site. As these plans take place, the risk conditions will change at the ORNL at Y-12 facilities.

#### C97D0086, ORNL Safety and Health - Building Electrical System Upgrades

The ORNL Condition Assessment Survey identified legacy vulnerabilities from fire and electrical shock hazards principally due to aging facilities and installations which do not meet the National Electrical Code. Many of these were categorized as urgency repair code #1 - asset condition critical, urgency repair code #2 - asset condition serious, or urgency repair code #3 - asset condition degraded. Money is not available to address large electrical safety infrastructure issues under current funding programs. Therefore, a building electrical system upgrade proposal is logical and cost effective. It is essential that these needs be identified within the budgeting process. The primary areas requiring this enhanced support are (1) wiring and panel board replacement, (2) circuit identification and removal of abandoned services, (3) upgrades of wiring to meet the National Electrical Code, and (4) motor control center upgrades.

#### C97D0071, Fire Protection Systems Upgrade (KC)

This ADS would provide upgrades to fire protection systems for control measures to protect life, property, and the environment from fire and its effects. The specific activities of this request are included in summary in ADS C97D0071 and in detail in the Field Work Proposals (FWPs) request funding for the upgrades. FWP ERKCL02 is a GPP funding request for Fire Protection Upgrades from Landlord funding of \$1,500K in FY 1999. FWP ERKCL30 is an operating expense funding request for the fire protection upgrades beginning in FY 1998. Three Accelerator and Reactor Improvement and Modification (ARIM) projects are proposed for HFIR fire protection upgrades (TEC-\$1,090K) in FY 1999. ADS C97D0147 is a related ADS identifying requirements for Line Item Fire Protection Upgrades.

#### C97D0056, Ammonia Treatment Columns for the Sewage Treatment Plant

The new NPDES Permit reduces the amount of ammonia allowed in the sewage treatment plant discharge. To ensure compliance with the permit, installation of additional ammonia removal equipment will be necessary.

#### C94D0002, Pollution Prevention Implementation - Operating Expense

Activities in FY 1998 require follow-up work to assessments and investigations previously completed. The establishment of between-use storage areas in three research divisions, the establishment of additional recycling programs for items such as batteries, project management for option implementation, installation of cooling water reticulation equipment, and opportunity implementation funds for purchasing equipment such as in-place lubrication fluid filters, pilot automated radiological monitors, dewatering equipment, and distillation equipment. This ADS request references FWP ERKC15, which was issued to request funding for pollution prevention implementation strategies using operating expense funding.

## **7.6 FY 1998 KEY RISK MANAGEMENT ES&H ISSUES**

The purpose of an ES&H issues management process is to assure that potentially significant issues are recognized, that summary-level information is communicated to the decision-making level, that expectations are established and assigned for resolution, and that issues are resolved in a complete and timely manner. The issues described in this document are intended to support an understanding and to work to resolve the set of high-level issues that represent strategic or high-level tactical concerns.

Initial identified FY 1998 key risk management issues are the following:

- Integrated safety management system,
- ORNL self-assessment of programs and activities against the BNL report,
- Integrated ES&H and infrastructure management process,
- Environmental Management Programs,
- Known ORNL vulnerabilities, and
- ES&H infrastructure issues.

Note: Only the last issue (ES&H and infrastructure issues) addressed will have corresponding ADSs referenced to identify resource allocation request and status. This is the first year for specifying the issues above the task level. The FY 2000 Budget Formulation Submission's Issues Management System will document the significant issues with resource allocation requests and status.

### **7.6.1 Integrated Safety Management System (ISMS)**

The Department of Energy issued DOE P 450.4, *Safety Management System Policy*, which requires both DOE and its contractors to systematically integrate ES&H protection into work

planning and execution at all levels. The requirement for implementation of this policy is specified in the DEAR clause. This clause requires that contractors establish and document for DOE approval of an ISMS consistent with the policy.

The ISMS is a comprehensive standards-based safety system used to address both work and business processes. ISMS is being institutionalized through DOE policy and contracts. DOE P 450.4 states that “The Department and contractors must systematically integrate safety into management and work practices at all levels so that missions are accomplished while protecting the public, the worker, and the environment. This is to be accomplished through effective integration of safety management into all facets of work planning and execution. In other words, the overall management of safety functions and activities becomes an integral part of mission accomplishment.”

On July 14, 1997, Draft DOE G 450.4-1, *Integrated Safety Management System Guide*, was issued to provide information on expectations associated with implementation of the policy. The implementation guide provides the link to DOE’s expectations for ISMS. The guide also provides information on the preparation, content, review, and approval of ISMS documentation.

#### **7.6.1.1 ISMS Milestones**

The following are scheduled for completion by the date specified:

- Issue an LMER policy for the implementation of the ISMS by December 31, 1997.
- Establish the LMER ISMS program description for ORNL by January 31, 1998.
- Initiate division-level ISMS plans in January 1998, with completion by August 1, 1998.
- Complete implementation of the LMER-wide ISMS by September 30, 1998.

#### **7.6.2 ORNL Self-Assessment of Programs and Activities Against the BNL Report**

During the period of February through April 1997, the Department’s Office of Oversight completed an evaluation of Integrated Safety Management, as applicable to ES&H programs, at Brookhaven National Laboratory (BNL). The oversight report was used as the basis for an assessment of ORNL operations against observations related to BNL operations. The “DOE Action Plan for Improved Management of Brookhaven National Laboratory” was issued July 1997. The “Integrated Management at Brookhaven National Laboratory - Implementation Plan” was issued on August 6, 1997, to respond to corrective actions identified in the previously issued action plan.

A self-assessment team comprised of DOE-ORNL Site Office (DOE-OSO) personnel and

ORNL personnel was chartered to review and assess ORNL programs against findings of the BNL report. The self-assessment focused on identifying potential institutional weaknesses or vulnerabilities in the ORNL ES&H management system. Approval of the self-assessment document corrective actions emphasizes ES&H issues that will receive significant effort during FY 1998.

#### **7.6.2.1 Opportunities for Improvement**

The following five ORNL opportunities for improvement were developed by addressing the seven guiding principles of Integrated Safety Management as identified in the “Department of Energy Plan for the Development and Implementation of Integrated Safety Management” [Implementation Plan for Defense Nuclear Facility Safety Board (DNFSB) Recommendation 95-2] and “Safety Management System Policy,” DOE P450.4, dated October 15, 1996.

**Issue:** Strengthen the DOE and ORNL line management roles and accountability for implementing ES&H requirements and initiatives.

Continuing improvements in ES&H line management at ORNL would best be assured by implementing command media which incorporate the “work-smart” standards developed through the ongoing N&S process and by implementing approved recommendations of the ongoing environment, safety, health, and quality (ESH&Q) reengineering team. Development of a functions, responsibilities, and authority procedure for the DOE-OSO would clearly establish DOE’s roles and responsibilities.

**Issue:** Strengthen the ORNL compliance training and qualifications programs.

Successful strengthening of ORNL compliance training and the ongoing qualification programs would be assured by implementation of the ongoing Human Resources reengineering recommendation for an integrated compliance training effort through improvements in training effectiveness, training data systems, and division-specific orientation, job planning, and training programs.

**Issue:** Strengthen the DOE and ORNL self-assessment programs.

Improvements in the self-assessment programs of facilities and systems and enhancements in processes for the identification and correction of deficiencies for both ORNL and DOE-OSO would assure effective self-assessment against ES&H requirements and initiatives.

**Issue:** Establish an improved ES&H issues tracking management system to address the roles and responsibilities of various offices that fund work at ORNL.

Development by ORNL and DOE management of an improved ES&H issues management system to address issues that arise from different programs, such as groundwater monitoring and environmental program data activities on the ORNL site, would avoid potential problems such as those which arose at BNL. Priorities established for multiprogram activities need to include an analysis of the impacts of these activities on ORNL missions.

**Issue:** Establish an ORNL ISMS

Development of an ISMS program would maintain an established and effective ES&H roles and accountability system. The ISMS is the departmental process for the sitewide management of ES&H activities developed in response to DNFSB recommendation 95-2 and implemented in departmental policy DOE P450.4. ISMS includes seven guiding principles and five steps for implementing ES&H management. ORNL's documentation of its ES&H management system is provided in a Safety Management System Description (which is synonymous with the ES&H Management Plan).

Note: The revised contract clause for integration of ES&H into work planning and execution is required by 48 CFR (DEAR) 970.2303-2(a).

**7.6.2.2 Self-Assessment Actions**

The resulting action plan was developed to respond to specific issues related to the opportunities for improvement identified by the self-assessment team. This action plan does not reflect every ES&H improvement activity currently under way at ORNL. The movement of the Laboratory toward full implementation of the principles of Integrated Safety Management and continued excellence in leadership and open communication will assure that continued emphasis is placed on the management of research at the Laboratory in a safe and efficient manner. To assure this emphasis, the following actions have been identified as necessary within the DOE and ORNL organizations and management processes.

Note: All actions are to be completed before October 1, 1998.

- **Action Item 1.A.** For interim use until DOE-ORO issues a Functions, Responsibilities, and Authority Manual (FRAM), develop a functions, responsibilities, and authority procedure for DOE-OSO to clearly delineate DOE's roles and responsibilities.
- **Action Item 1.B.** Complete the development of remaining ORNL WSSs through the N&S process.
- **Action Item 1.C.** Issue appropriate command media to reflect WSSs implementation at ORNL.
- **Action Item 1.D.** Finalize the draft procedure outlining how DOE-OSO performs operational awareness. Include within the scope of the operational awareness visits the need to review adequacy of planning associated with activities, as well as facility conditions.
- **Action Item 2.A.** Implement the ORNL Human Resources reengineering recommendation for an integrated compliance training effort through improvements in training effectiveness, training data systems, division-specific orientation, job planning, and training programs.

- **Action Item 2.B.** Complete ORNL plans to enhance the existing WMRAD training database to serve the entire Laboratory.
- **Action Item 2.C.** Develop training requirements for DOE-OSO personnel performing surveillance of nonnuclear facilities.
- **Action Item 2.D.** Develop and implement a Laboratory-level policy requiring review of personnel training and qualifications as part of job planning.
- **Action Item 3.A.** Revise the ORNL ES&H self-assessment training program to include a requirement for an assessment of adequacy of ES&H implementation relative to hazards presented.
- **Action 3.B.** Modify the Internal ESHQ Integrated Management Assessment process to assure that, during every organization's triennial assessment, a review is performed of selected work packages/projects or experiments to determine adequacy of ES&H implementation relative to hazards presented.
- **Action Item 3.C.** Perform a one-time assessment of facilities, systems, and operations to assure that (a) knowledge of risks posed by their facilities, systems, and operations is current and complete; (b) management systems to mitigate the risks and to improve operations are current, adequate, and implemented; and (c) self-assessment efforts provide maximum return for the investment made.
- **Action Item 3.D.** Provide to the Laboratory Assessment Program Manager a current copy of Division/Office/Program Self-Assessment Plans.
- **Action Item 3.E.** Conduct a review of selected work packages/projects/experiments to determine the adequacy of ES&H implementation relative to the hazards presented by work performed.
- **Action Item 3.F.** Examine each of the current ORNL Self-Assessment Plans for adequacy (scope, roles, and responsibilities) and report improvement needs to the Division/Office/Program Directors and the Director of Operations, Environment, Safety, and Health.
- **Action Item 3.G.** Address identified inadequacies of the Division/Office/Program Self-Assessment Plans and implement needed changes.
- **Action Item 3.H.** Establish a Risk Ranking Board made up of respected Laboratory personnel to establish consistent prioritization of commitments and budget activities.
- **Action Item 3.I.** Establish the infrastructure (procedures, protocols, and reporting structure, as necessary) for the Risk Ranking Board.
- **Action Item 3.J.** Evaluate the need for an Independent Assessor Group to perform

assessments requested by line management as a service, to perform independent follow through (validation and verification) of previously identified concerns, and to perform performance observations on a continuous basis. Report evaluation results to the Environment, Safety, Health and Quality Committee.

- **Action Item 4.A.** Identify potential negative ES&H impacts on ORNL's R&D mission as a result of DOE's Environmental Management Program-funded activities and present information to the ORNL Executive Committee for awareness and needed improvements.
- **Action Item 4.B.** Develop an improved ORNL ES&H issues management system to address issues that arise from different funding programs. Develop the system to include a method to determine an analysis of impact on ORNL R&D and ES&H missions (e.g., groundwater monitoring and environmental program data activities on the ORNL site).
- **Action Item 5.A.** Establish an ORNL ISMS Program which maintains an established and effective ES&H roles and accountability system.
- **Action Item 5.B.** Ensure adequate planning and prioritization for ES&H and infrastructure maintenance/improvement activities by strengthening the planning and budget support systems.
- **Action Item 5.C.** Issue an ORNL requirement that SAR issue/update schedules, as reflected in Revision 3 of the SAR/TSR Implementation Plan, ES/ESH-67, be reviewed quarterly with revisions to the plan identified and completed as needed.
- **Action Item 5.D.** Develop a proposed ORNL method for prioritizing updates of nuclear facility SARs based on risks associated with gaps in existing documents.
- **Action Item 5.E.** Develop a proposed ORNL method for the allocation of funding to upgrades of SARs for facilities with the highest risk scores.
- **Action Item 5.F.** For SAR updates of those ORNL facilities that are indicated as being not adequately funded in Revision 3 of the SAR/TSR Implementation Plan, ES/ESH-67, prepare a listing with potential impacts of not funding and meeting established implementation dates and submit to the ORNL Deputy Director and the Associate Director for Operations, Environment, Safety, and Health for a decision of funding or alternate actions.
- **Action Item 5.G.** Ensure that the replacement document(s) for FS-4.1, "Accelerator Safety," and FS-4.2, "Safety Assessment Documentation Program for Accelerator Facilities," adequately address ORNL facility assessments, authorization, and DOE-ORO involvement.
- **Action Item 5.H.** Evaluate the adequacy of the ES&H portion of experiment reviews performed by ORNL R&D divisions/programs.

- **Action Item 5.I.** If the results of the ORNL experiment reviews evaluation indicate a problem, develop basic guidelines for experimental reviews.
- **Action Item 5.J.** Include a list of documents that is acceptable for comprising the nuclear facility FABs in the Laboratory guidance document for updating FABs.
- **Action Item 5.K.** Issue an ORNL directive that defines the “Gatekeeper” process for requirement consideration and adoption.
- **Action Item 5.L.** Perform an evaluation of the ORNL system effectiveness nine months after issuance of the directive.

### **7.6.3 Integrated ES&H and Infrastructure Management Planning Process**

ORNL is currently developing a single ES&H and infrastructure planning process to provide a means for ORNL to document, prioritize, and report ES&H and infrastructure planning and budgeting information. The ES&H management planning process was piloted during FY 1991 and has been revised to the currently used process. The infrastructure management planning process began a pilot during FY 1996 and FY 1997. Following the self-assessment performed at ORNL against the BNL appraisal report, a need was identified to assure that all ES&H and infrastructure activities were integrated for resource requirements decision making following a risk ranking common to both ES&H and infrastructure activities. The integrated system would provide the capability to identify and track ES&H and infrastructure projects and activities; to identify milestones and track accomplishments; to document risks, impacts, and/or benefits of activities; to compare risk evaluations for resource allocations; and to provide a system for resource identification and tracking.

The integrated planning process would require that all activities be documented on an ADS. The information for the ADS would be entered through the PMTS. PMTS is currently being modified to allow full business system integration to the ES&H and infrastructure management planning systems. Each ADS would be individually prioritized by members of the ORNL Risk Ranking Board for risk determination. Resource decisions concerning allocations and request would be made by management following ranking of activities. The ES&H and infrastructure management system would contain an Issues Management System (IMS) which would identify the major issues and resource allocation decisions. The IMS is a Web-based data system which allows for the documentation of issues and documentation and tracking of needed actions to respond to the issues; it provides real-time access to ORNL and DOE personnel.

#### **7.6.3.1 Integration Issue Milestones**

All of the following are scheduled for full implementation by October 1, 1998:

- Integrate ES&H and infrastructure database systems. (Complete)

- Integrate information into database system.
- Appoint a single ORNL Risk Ranking Board for the risk prioritization. (Complete)
- Develop single risk ranking process for both ES&H and infrastructure activities.
- Complete programming to allow the full integration of the PMTS with the ES&H and infrastructure management planning systems.
- Develop a Web-based Issues Management database system integrated into the ES&H and infrastructure database and the PMTS system for tracking of issues and resource allocation decisions. (Complete)
- Enter identified priority ES&H and infrastructure issues into IMS tracking and assign issue tracking responsibilities to appropriate personnel.
- Begin resource allocation comparison analysis for ORNL Operating Committee and Executive Committee members.

#### **7.6.4 Environmental Management Programs**

Major changes are underway in Oak Ridge programs administered by the DOE Office of Environmental Management (DOE-EM), with significant impacts expected on ORNL's support to those programs. Near- and long-term ES&H issues are present for two DOE-EM activities: Waste Management (EM 30) and Environmental Restoration (EM 40).

##### **7.6.4.1 Waste Management Issues**

Plans are under way for transition of waste management responsibilities for ORNL's newly generated waste from EM 30 to DOE-ER in FY 2000. While this transition provides an opportunity to recover the physical facilities and fiscal responsibility for this critical component of ORNL's research-supporting infrastructure, several near- and long-term issues must be resolved. These include

- Distinction between facilities primarily associated with newly generated wastes and facilities with legacy waste. Significant disagreement on these facility splits is expected, and near-term negotiations with the DOE-EM program will be needed.
- Determination of the appropriate approach for charge-back of waste management costs to generating divisions or justification for a decision not to charge back at that level and to operate instead with base program support and division-specific performance measures to ensure appropriate waste controls.
- Development of a thorough understanding of the long-term DOE-ER vulnerabilities associated with these responsibilities, including inventories of orphan wastes, waste management facilities decontamination and decommissioning (D&D) and closure costs, and regulatory commitments under permits and/or Federal Facilities Agreements.

Each of these issues could have significant impacts on research funding levels at ORNL and on the Laboratory's mission success.

A positive situation exists for waste management, however, in that the reengineering of waste management operations at ORNL is completed and has identified significant savings potential for the generating organizations as well as WMRAD. Costs and specific recommendations have been estimated, and millions of dollars a year can be saved through implementation of the identified improvements. Recommendations are being implemented.

ORNL WMRAD is responsible for operation of all waste management facilities at ORNL [with the exception of the CYRTF (Coal Yard Runoff Treatment Facility) and the sanitary sewage system], as well as facility upgrades and construction of new waste management facilities.

#### **7.6.4.2 Environmental Restoration Issues**

The Oak Ridge Environmental Restoration program is entering a new phase as DOE selects a management and integration (M&I) contractor to execute the Oak Ridge Operations Office Environmental Management *Accelerating Cleanup: Focus on 2006* plan (formerly known as the *Ten-Year Plan*). This will affect ORNL in three primary areas: (1) reduction in ORNL direct scientific and support labor in project implementation; (2) increased ORNL vulnerability as outside remediation firms conduct remedial actions near active research and administrative support areas; and (3) regulatory decision-making on long-term land use plans for major portions of the ORNL site. Near-term impacts on research and support divisions are already being felt as DOE steps up its strategy for outsourcing major components of the remediation program. Proactive marketing to existing EM 40 sponsors, teaming with local commercial firms, and seeking new environmental business clients are all part of the emerging ORNL strategy for managing the first issue. Both the ES&H concerns related to increasing site presence of new contractors and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) decision-making process related to long-term land use designation for ORNL property need close scrutiny as the new M&I contractor is selected and begins ownership of these issues.

Environmental restoration and legacy waste management activities at ORNL are now the line responsibility of the Environmental Restoration Division of the LMES Environmental Management and Enrichment Facilities Business Unit. LMES elected not to participate in the competition for the M&I contract for environmental management of DOE's Oak Ridge facilities; therefore, a change in responsibilities will occur during FY 1998. ORNL will work with DOE-ORO to address the issues and explore the opportunities presented by this change.

The remedial action component of the Environmental Restoration Program addresses the investigation and remediation of contaminated sites and contaminated environmental media at ORNL. Environmental data for remedial sites are collected in cooperation with other efforts at ORNL (e.g., OEP) with support from technical staff in the Environmental Sciences

Division, Energy Division, and other ORNL organizations to address contaminant transport in the complex hydrogeologic setting at ORNL. Efforts to evaluate and remediate environmental problems build on ORNL research efforts supported by DOE's Office of Energy Research and other basic science programs. The program also includes deactivation, surveillance and maintenance, and D&D (here decommissioning is demolition or reuse) of contaminated surplus facilities.

The strategy for implementing the ORNL Environmental Restoration program includes the following steps:

- Sites are prioritized for rapid actions on the basis of risk to human health and the environment. Rapid actions are taken to address contaminant releases and transport to off-site surface water and local groundwater. These must be consistent with likely future final actions. Monitoring at key locations quantifies and tracks contaminant releases and identifies major sources of contaminant release.
- Remedial investigations are conducted to provide the information needed to formulate and implement final remedial actions. This step also includes working with stakeholders to establish land use objectives, conducting technology development activities, and performing feasibility studies.
- Remediation is conducted to achieve the final goals for risk reduction and compliance with environmental regulations commensurate with planned or potential future land use.
- Monitoring is continued at key locations to document the performance of remedial actions, evaluate the need for contingent actions, and identify remaining or new areas of concern.

#### **7.6.5 Report on Status of Known Vulnerabilities at the Oak Ridge National Laboratory**

A notable issue for FY 1998 relates to follow-up of the report on the *Status of Known Vulnerabilities Oak Ridge Operations Site: Oak Ridge National Laboratory* (report included in Section 7.6.5.1). Vulnerabilities associated with this report have been documented; corrective action plans and implementation plans have been developed and will not be repeated in this document. The report describes each vulnerability and the current status. The FY 2000 ES&H and Infrastructure Budget Formulation Plan Issues Management System will acknowledge issues associated with each vulnerability.

##### **7.6.5.1 Vulnerabilities Report**

### **STATUS OF KNOWN VULNERABILITIES OAK RIDGE OPERATIONS**

## **SITE: OAK RIDGE NATIONAL LABORATORY**

### **I. EXECUTIVE SUMMARY**

This report reassesses the status of known vulnerabilities (chemical and radiological) at Oak Ridge National Laboratory (ORNL). ORNL is managed by Lockheed Martin Energy Research Corporation (LMER) for the U. S. Department of Energy (DOE). The ORNL site also includes facilities in DOE's Environmental Management program which are managed by Lockheed Martin Energy Systems (LMES). These facilities are included in this report. Additionally, ORNL operates certain facilities at the Y-12 site and these facilities are also included in the scope of this report.

Chemical and radiological vulnerabilities at the ORNL site have been identified in recent years by DOE, the Defense Nuclear Facilities Safety Board (DNFSB), and by contractor self-assessment. These vulnerabilities have been documented and entered into corrective action programs and implementation plans. Significant progress on the mitigation of the identified vulnerabilities has been made in many areas, notably the reduction of unneeded chemicals, the near-term removal of sodium and lithium hydride, progress on the plutonium vulnerability actions, shock-sensitive perchlorate removal, and major risk reduction achievements at the Molten Salt Reactor Experiment. In the interim as corrective actions are implemented for the vulnerabilities, appropriate surveillance, maintenance, and controls are applied such that the safety of the workers and public is ensured. Additionally, waste storage tanks were reviewed for possible chemical reactions. Integrity and safe operation of waste tanks is ensured by appropriate waste acceptance criteria and implementation of the Tank Compliance Program under the Federal Facility Agreement. Follow-up reviews of waste tank reports have been identified for action.

ORNL was founded in 1942 during the Manhattan Project. It is the largest of the U.S. Department of Energy's five multiprogram energy laboratories and has a current annual budget of more than \$500 million. ORNL has a staff of about 4400 employees, plus more than 4000 visiting researchers. Major programs exist in energy conservation, materials development, magnetic fusion energy, nuclear safety, robotics and computing, biomedical and environmental sciences, medical radioisotope development, and basic chemistry and physics. It is home to sixteen uniquely equipped research facilities open to researchers from industry and universities.

The mission of the ORNL is to conduct basic and applied research and

development (R&D) in order to advance the nation's energy resources, environmental quality, and scientific knowledge and to contribute to educational foundations and national economic competitiveness.

## II. STATUS OF CHEMICAL VULNERABILITY REPORTS

### II. A. Tomsk Reviews

On April 6, 1993, at the nuclear fuel reprocessing plant of the Siberian Chemical Combine at Tomsk-7, Russia, a sequence of events occurred that caused substantial physical damage to the facility. A runaway exothermic chemical reaction occurred in a large process vessel which contained a concentrated solution of uranyl nitrate along with nitric acid, plutonium nitrate, residual fission products totaling about 560 curies, and uncertain amounts of organic constituents derived from the solvent extraction process. In response to the Tomsk-7 incident, DOE initiated a series of reviews at DOE sites to assure that similar conditions do not exist in DOE processing vessels. After survey of the ORNL site, the Tomsk review focused on a detailed review of the large scale development facility [the Integrated Process Demonstration (IPD) Facility], and a limited review of the Radiochemical Engineering Development Center (REDC). The review also considered a tank of thorium nitrate at building 3019. The conclusion of the reviews, as documented in the August 1993 DOE report, was that a nitrate-organic reaction at ORNL was extremely unlikely. In 1994, following that review, the scope was broadened somewhat for self-evaluation of all potential nitrate-organic safety hazards (Tomsk-II review). There were no nitrate or organic safety concerns identified in this followup review other than those previously evaluated. Three actions were taken at the IPD as a result of the Tomsk reviews.

Since the Tomsk evaluations, the IPD facility (Building 7602) has been shut down. All of the process chemicals were removed from the facility following flushing of the systems. The facility is currently in the EM-60 funded High Ranking Facilities Deactivation Project. No chemical process development/operations are permitted in the IPD facility. The Robotics and Process Systems Division is currently performing chemical separations development using depleted uranium and organic solvents in Laboratory 3, Building 7603. The relatively small quantities of material (tens of liters) are recycled without concentration (heating) of solutions. Also, the nitric acid solution concentrations used in the development program are less than those

that caused a problem at Tomsk-7. These operations are carried out in a walk-in hood and are closely monitored by an engineer or technician. Organic solutions are stripped of uranium using the solvent extraction equipment and recycled for testing. Any uranium solutions that have uranium concentrations within a range acceptable for future tests are stored and reused. Laboratory 3 does not have the process capability to boil down solutions. At either the conclusion of the testing program or when the solution storage capacity is reached, Y-12 has agreed to accept these solutions. Y-12 will, within their own processes, recycle these solutions or discard them as waste.

Since the Tomsk evaluations, the relevant operations and controls are basically unchanged at the REDC. That is, the REDC facility incorporates dissolution, solvent extraction, and ion exchange operations that recover and purify transuranic isotopes from targets irradiated in the High Flux Isotope Reactor. Only the solvent extraction step, along with its associated feed preparation and waste handling operations, is of concern for potential nitrate-organic reactions. Volumes of the reagents are low, with tankage limited to a few tens of liters, and the inventory in the contactors is small. Based on safety demands of the processes carried out and the highly limited quantities of materials in process at any time, it was concluded during the Tomsk review that the safety of these operations with respect to nitrate-organic reactions was clearly established. This conclusion remains valid.

The tank of thorium nitrate (approximately 15,000 liters) remains at building 3019. However, its disposal is now included in the scope of actions for the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 97-1. The implementation plan for this recommendation identifies planned disposal of excess material beginning in FY 1999. The planned disposal method is solidification or fixation of the material with a solid. The tank is periodically sampled and there is no evidence of organics. The tank is ventilated to the ORNL process off-gas system. The controls and monitoring are adequate precautions until disposal of the material.

## II. B. Chemical Vulnerability Report

The DOE Chemical Safety Vulnerability Working Group conducted a field assessment of the Oak Ridge Reservation in April 1994. The purpose was to review and identify chemical safety vulnerabilities that might result in (1) fires or explosions from uncontrolled chemical reactions, (2) exposure of workers or the public to hazardous chemicals, or (3) release of hazardous chemicals to the environment. The review identified five vulnerabilities for the Reservation. The

September 1994 Management Response Plan addressed those vulnerabilities with near-term and short-term actions. At the time of the 1994 Response Plan, the open actions for ORNL were: (1) removal of radioactive sludge from a ventilation sump in building 3047 and (2) relocation of laboratory activities in building 3047 to a facility with proper handling and storage facilities and with proper eyewash and safety showers. These actions have since been completed. The relocation of the laboratory involved the removal for disposal of over 500 chemicals. A gamma counting facility associated with this laboratory remains in building 3047.

The more long-term and comprehensive response to the generic vulnerabilities was addressed in the Comprehensive Site Response Plan to the Chemical Safety Vulnerability Working Group Report published in June 1995. This response identified the programs, initiatives, and activities to address the generic concerns. In addressing the removal of excess or unneeded chemicals, the report identified the unneeded elemental sodium (62.5 tons) and lithium compounds (3.5 tons) stored at two ORNL facilities. These facilities are the Tower Shielding Facility (Facility 7700) and Building 9201-3 at Y-12. If changed from their solid state to a liquid state, these materials have the potential to react vigorously with oxygen and water and to generate fires and toxic releases. Controls are applied for water use and fire protection. An evaluation is underway for the removal of the sodium and lithium hydride shields from the Tower Shielding Facility. One possible option is to convert the metallic sodium into sodium hydroxide for waste water treatment. The proposed schedule is to complete the removal by the end of the first quarter of FY 1999. In the meantime, the containers are inspected on daily checks for leaks and any other abnormal conditions. The integrity of the containers is also inspected semi-annually by the Quality Office. Building 9201-3 has five shutdown alkali metal facilities. Work plans have been prepared and funding obtained for the metal removal which is expected to begin in 1997 and to be completed early in 1998.

The program and activities described in the Site Response Plan that address the generic vulnerabilities continue as they have evolved and matured. These programs will be described in the progress report to Secretary Peña at the end of 1997.

## II. C. Highly Hazardous Chemicals

The ORNL site does not have chemicals in process or inventory that exceed the threshold quantities in the OSHA rule for Process Safety Management of Highly Hazardous Chemicals (29 CFR 1910.119) or the Environmental Protection Agency Risk Management Plan rule (40 CFR 68). The ORNL site participated in the DOE assistance support

visit for Process Safety Management in August 1996. There were no observations identified relative to ORNL during the visit.

### III. STATUS OF RADIOLOGICAL VULNERABILITY REPORTS

#### III. A. Plutonium Vulnerability and Recommendation 94-1

In June 1994, a comprehensive assessment of the environmental, safety, and health vulnerabilities arising from the storage and handling of plutonium (Pu) holdings at the Oak Ridge site (ORNL and Y-12) was conducted. The Pu Vulnerability Management Plan (DNFSB Recommendation 94-1 Implementation Plan) identified one milestone item for ORNL. This milestone is IP-3.2.017, "Repackage all Pu metals and oxides to meet the metal and oxide storage standard." This standard addresses the long term storage of these materials. The completion of the 12 work breakdown structure activities in the preparation phase for this milestone resolves 11 of the 12 identified vulnerabilities. The actual repackaging and disposal remains open. ORNL has no long term storage facility or equipment to prepare material for long term storage. ORNL has identified in the Site Integrated Stabilization Management Plan (SISMP) the actions, schedule, and proposed destination for disposal of unneeded Pu material at ORNL.

Recommendation 94-1 also identified concern for the storage of Spent Nuclear Fuel (SNF), both in terms of integrity of the fuels and the integrity of the SNF storage facilities. The implementation plan was developed to assure the timely remediation of these vulnerabilities, provide for safe interim storage of stabilized inventories, and promote smooth transition to future dispositioning activities. The SNF at ORNL is primarily spent fuel from research or experimental reactors that are operating or have operated at ORNL. The SNF at ORNL is currently stored in various types of facilities including underground retrievable dry storage units, above-grade buildings, hot cells, and wet storage basins. At Oak Ridge, the Spent Fuel Working Group Report identified six ES&H vulnerabilities. Four of these vulnerabilities have been resolved. The remaining two (MSRE and SWSA 5-N storage) are being addressed in the SISMP.

#### Molten Salt Reactor Experiment (MSRE)

The MSRE operated from 1965 through 1969 to investigate molten salt reactors for commercial power applications. The reactor used a fluoride salt mixture of lithium, beryllium, and zirconium fluorides with uranium tetrafluoride as the fuel component. The reactor was

initially fueled with  $^{235}\text{U}$ , and then replaced with  $^{233}\text{U}$  in 1968. An addition of less than 1 kg of Pu trifluoride was made in 1969. When the reactor was shut down, the fuel salt was drained into two fuel drain tanks in the drain tank cell where it cooled and solidified. Following a post-operation examination, the facility was placed under a program of surveillance and maintenance awaiting eventual decontamination and decommissioning. Radiolysis of the fuel salt was expected to slowly produce fluorine ( $\text{F}_2$ ) gas after a latent period, and a procedure to annually anneal the salt to recombine free fluorine with the salt matrix was part of the Surveillance and Maintenance program.

In the late 1980s, radiological surveillance at the facility indicated elevated gamma radiation in the North Electric Service Area inside the facility in piping connected to drain tanks. A visible release of an unidentified gas was also observed from the off-gas system piping in the vent house during a maintenance operation. This evidence indicated that contamination associated with the stored fuel salt may have migrated from the drain tanks. Plans were developed and initiated to investigate the migration problem and to determine appropriate mitigative measures. Gas samples taken from the off-gas piping in the vent house indicated significant concentrations of  $\text{UF}_6$  and  $\text{F}_2$ . Radiation readings in the adjacent charcoal cell also determined that a significant deposit of solid uranium exists in the inlet section of the auxiliary charcoal bed (ACB). As a result of the designed shutdown condition, the cell containing the ACB remained filled with water, and as a consequence, the ACB section containing the uranium deposit was surrounded by water. If water from the cell were to have entered the ACB and migrated to the deposit, there was the potential for an accidental criticality.

The migration of uranium (83.9%  $^{233}\text{U}$ ) from the drain tanks to other locations within the MSRE off-gas system was triggered by the unanticipated formation of  $\text{UF}_6$  from the uranium tetrafluoride ( $\text{UF}_4$ ) in the fuel salt. The  $\text{UF}_6$  reacted in part with activated charcoal, occupied the off-gas volume, and formed solid, non-volatile deposits in other parts of the off-gas system. The fluorine in the off-gas system also reacted at low temperature with the activated charcoal in the ACB to form fluorides of carbon. These compounds, such as  $\text{C}_2\text{F}$  or  $\text{C}_3\text{F}$ , are highly exothermic if subjected to elevated temperatures. Thus an additional consequence of the reactive gas migration is a chemical deflagration potential sufficient to expel the contained uranium from the bed and the charcoal bed cell directly to the environment. This migration caused a condition that was outside the original safety authorization basis for storage of the fuel salt in the MSRE.

A comprehensive plan was initiated in 1994 to implement interim corrective measures, remove the reactive gases, chemically passivate the fluorinated charcoal to eliminate the explosive potential, remove the uranium deposits, and convert these materials to stable oxide for interim storage. The interim corrective measures (IP-3.5-010) to mitigate criticality potential, stop continued uranium migration to the charcoal bed, and enhance the containment of the charcoal bed cell to prevent radionuclide releases from a potential explosion were completed in November 1995. Since then, the off-gas system piping, the flush tank, and one of the two drain tanks have been depressurized (the system had pressure buildup due to the reactive gases of uranium hexafluoride and fluorine) and removal of the reactive gases continues by chemical trapping. The traps with the absorbed uranium are being stored in building 3019. Non-volatile blockages in the piping system are being bypassed or unplugged by chemical gas treatment. Actions are underway in preparation for solid uranium deposit removal from the ACB and conversion of uranium compounds to stable oxides. The fuel salt in the drain tanks and flush tank is to be removed and stabilized. These remediation actions are a part of DNFSB Recommendation 94-1.

The corrective actions taken thus far have greatly reduced the risk associated with the MSRE vulnerability, and the additional actions now in preparation and planning will fully remediate the vulnerability.

### III. B. HEU Vulnerability

In February 1996, DOE initiated a comprehensive Environment, Safety, and Health (ES&H) assessment of its inventory of Highly Enriched Uranium (HEU). The HEU Vulnerability Assessment identified vulnerabilities at ORNL which are recorded in the HEU Working Group Report. The HEU Vulnerability Management Plan identifies action items and schedules to correct the identified vulnerabilities.

Building 3019 at ORNL was listed by the HEU Working Group as one of the most vulnerable facilities. The facility was found to have five facility-specific vulnerabilities, two of them significant, and three adverse institutional factors. The major issues of concern include facility damage from an earthquake or high winds, leakage of a solution storage tank, and failure of U-233 storage containers. Any of these events could result in worker and public exposure and contamination of the environment.

A comprehensive natural phenomena evaluation being performed as part of the facility's Safety Analysis Update program is scheduled for

completion by September 1999. Facility weaknesses noted during that evaluation will be corrected at a later date. The solution storage tank—it contains 15,000 liters of thorium nitrate and 130 grams of U-233—was analyzed to ensure proper leakage confinement during transfers via outdoor, singly contained pipelines. All tank transfers are being closely monitored by workers. Final corrective action will involve identifying an acceptable long-term storage/disposal alternative, converting the contained solution to an acceptable form, and preparing the converted material for long-term storage/disposal. A decision on the long-term storage/disposal alternative will be part of the DNFSB Recommendation 97-1 Implementation Plan.

Planning is also under way to ensure against the failure of the U-233 storage containers during their removal from the facility's tube vaults. The plans feature the design of a ventilated confinement system for use while removing the (possibly degraded) containers. In addition, the facility's ventilation and building confinement system is to be evaluated to determine the necessary upgrades for reduction of the extrafacility impacts of container failure.

Approximately 200,000 grams of HEU has been identified as unneeded at ORNL and is being included in the SISMP for disposal as unneeded material. DOE has concurred with including this unneeded material in the SISMP.

### III. C. Safe Storage of Uranium-233 and Recommendation 97-1

DNFSB Recommendation 97-1 addresses the need to safely store the existing inventories of unirradiated uranium-233 (U-233) bearing materials. A significant portion of the DOE inventory of U-233 is in storage at building 3019 at ORNL. An implementation plan has been recently submitted by DOE to the Board. The primary safety issue being addressed with the implementation plan is the lack of material characterization and uncertainty of storage conditions for U-233. The implementation process is being accomplished in the shortest possible time consistent with a graded approach, available funding, and safety of the personnel involved. At the same time, the safety of existing U-233 storage is ensured through near-term risk assessments, surveillance activities, and safety assurance actions. The U-233 associated with MSRE is addressed under the implementation plan for DNFSB Recommendation 94-1, and is therefore outside the scope of 97-1. However, once the U-233 material is removed from MSRE and stabilized, it will enter the scope of 97-1.

## IV. OTHER VULNERABILITY REVIEWS

### IV. A. Seismic Evaluation\*

Executive Order (EO) 12941, *Seismic Safety of Existing Federally Owned or Leased Buildings*, was prepared to reduce the vulnerability to buildings owned or leased by agencies or departments for Federal use. The goals of EO 12941 are to develop listings of Federally owned buildings, identify vulnerable buildings within the listings, and prepare cost estimates for rehabilitating these buildings. The inventory and cost estimate information collected will be used to develop reliable information for developing future national public policy for mitigating seismic risk of vulnerable buildings within the Federal inventory.

The ORNL building scope includes buildings that are physically located at ORNL, ETTP (formerly K-25), and the Oak Ridge Y-12 Plant. The ORNL report addresses buildings physically located at the ORNL plant site. ORNL buildings located at ETTP and Y-12 plant sites will be included in the EO 12941 implementation reports for those sites. At ORNL, there are six contractor (LMER) leased buildings and 513 DOE owned buildings. Of the 513 owned buildings, 355 were determined, through a screening process, to be exempt from the requirements of EO 12941. One hundred fifty-eight\* owned buildings were found to be non-exempt. Of the 158\* non-exempt buildings, one building was identified as “Definitely Needing Rehabilitation” and two were identified as “Exceptionally High Risk.” Thirty-five\* buildings were found to be seismically vulnerable. Programs to fully mitigate the identified vulnerable buildings will be developed by the Federal Emergency Management Agency and Congress after December 2000. The total estimated cost for rehabilitating ORNL buildings is approximately \$31 million.

#### IV. B. Fire Protection Assessment

Fire protection was one of the four areas selected in the DOE ES&H Assessment of ORNL in August 1997. The assessment identified four “concerns” in the fire protection area that should be corrected to enhance the program’s effectiveness. These concerns are under evaluation by ORNL for possible corrective actions.

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\*ORNL/M-6145, *Executive Order 12941 Implementation at the Oak Ridge National Laboratory*, contains an update to the original data in this report. One hundred fifty-nine owned buildings were found to be non-exempt, and 27 buildings were found to be seismically vulnerable.

#### IV. C. Waste Drum Over-Pressurization

As a result of the recent drum over-pressurization event at the Paducah site, the potential for similar events at ORNL is being evaluated. The Waste Management and Remedial Action Division (WMRAD) at ORNL has reviewed data on their Hazardous Waste Operations Corrosive Drum Inventory and is performing these actions: 1) inspection of mixed and hazardous waste inventory including daily inspections. (As an example of effectiveness, the walkdown revealed one drum that was beginning to bulge, and it was removed and remotely punctured. The drum contained absorbent used in a cleanup of potassium hydroxide.); 2) inventory review of corrosive waste (this inventory consists of 177 drums plus other bottles and packages totaling approximately 2000 items); 3) inventory review of TRU drums which have been classified as mixed waste to determine if there is concern; and 4) provide recommendations and guidance for inspection criteria to other ORNL divisions with drums of hazardous material.

Drum overpacks for corrosive waste do not appear to be a problem at ORNL. Daily inspection is being performed on drums with nitric acid in the contents. Offsite shipment and repackaging is planned for some corrosive waste drums. In the last year, a significant number of hazardous waste drums were repackaged, processed, or put in new containers by WMRAD that have reduced the vulnerability of waste drum over-pressurization. Previously 100% verification of Low-Level Waste and TRU waste was performed at the Waste Examination and Assay Facility; this has been reduced to 10% verification due to funding limitations, and the implications of this action are not yet known.

#### IV. D. Perchlorate Hood Contamination

In the 50 years that ORNL has conducted research, numerous operations involved the use of hot perchloric acid in chemical fume hoods. Salts from these operations, when deposited in ductwork, present a potential to cause fires and explosive reactions, placing hood users and maintenance personnel at risk. Considering this, ORNL initiated a Perchloric Acid Contaminated Hood Decontamination and Deconstruction Team and Committee comprised of multi-divisional representatives. Their efforts resulted in the development of an improved NFPA testing method and a unique sampling and decontamination procedure. The group, during 1993 to 1996, planned and executed decontamination and deconstruction of 40 perchlorate contaminated ventilation systems in a safe, environmentally correct and cost effective method. This procedures resulted in transfer of technology to Los Alamos National Laboratory, Brookhaven National Laboratory, ETTP, Y-12, and over 500 commercial businesses. It has been highlighted in the *DOE Safety Connection*, the *ORNL Review*,

a peer reviewed national publication and eight national scientific conferences. All known contaminated hoods have been remediated and the team continues to enhance ORNL research operations and safety compliance through review of the use of perchloric acid. High concentration levels of perchlorates located in the exhaust ductwork of the shutdown hot cells in building 3019B have been identified in the past year. This is a shock-sensitive, explosive vulnerability. Remediation of this vulnerability awaits funding and the ductwork has been posted to prevent disturbance in the meantime. Also, the building is unoccupied and access is controlled.

## V. WASTE TANK REVIEW

Waste storage tanks and ancillary equipment at ORNL were reviewed to ensure that they were identified, characterized, and considered for possible chemical reactions. ORNL WMRAD assures integrity and safe operation of waste storage tanks through two methods: 1) Waste Acceptance Criteria (WAC) for the liquid waste systems and 2) implementation of the Federal Facility Agreement (FFA) Tank Compliance Program.

The WAC, and approved variances, places restrictions on types of chemicals that can be introduced and provides all active tanks and their ancillary systems protection from active waste streams creating chemical incompatibilities or damage to system structure. The WAC includes criteria to minimize the addition of nitrate bearing wastes, no addition of specified RCRA-regulated solvents, restrictions on concentration of soluble and non-soluble organic solvents, and prevention of explosive or pyrophobic material.

Inactive tank systems controlled under the FFA program are scheduled for waste and risk characterization, obtaining information on liquid low-level sludge, repairing tank systems, monitoring and maintenance, evaluation of tank contents removal, removal from service of systems not meeting requirements, and transfer of inactive tanks from Waste Management to the Environmental Restoration (ER) program, for remediation by their Inactive Tanks Program Team. An integrated approach to the isolation and remediation activities is now being implemented by WMRAD and ER. The combined isolation and remediation activities were developed by WMRAD and ER and approved by the Tennessee Department of Environment and Conservation and the U.S. Environmental Protection Agency.

Waste Characterization data has been collected and an associated risk assessment has been performed on the data for inactive tanks. This information is contained in the *Waste Characterization Data Manual*

*for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory*, DOE/OR/01-1159&D1 (supercedes ES/ER-80), June 1993 and the *Risk Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory*. DOE/OR/01-1168&D1, July 1993. Follow up actions to this issue will include a review of these reports to ensure that 1) the risks associated with chemical vulnerabilities in inactive waste tank systems have been adequately identified and 2) the waste characterization data provided will be compared to assure that the makeup of the waste stored at the time of the characterization was performed for the report and was consistent with the most current WAC.

### **7.6.6 ES&H Infrastructure Issues**

Section 6.4 addressed issues that were specific to ES&H infrastructure during FY 1997. This section will address those issues that remain as concerns for the Laboratory. Adequate funding for, and management of, infrastructure are critical to the success of the DOE and ORNL missions. The success of missions, the H&S of workers, and the protection of the environment are all dependent upon adequate infrastructure. At a time of mission uncertainty, decreasing program budgets, and pressures to reduce facility overhead, investments in infrastructure are often increasingly difficult to make. However, underfunded infrastructure does not save cost in the long term. Deferred maintenance and infrastructure improvements soon result in increased construction needs, make operations less efficient, and increase ES&H risks. A specific concern is that infrastructure funds are sufficient only to meet the Laboratory's most critical needs and do not permit orderly replacement of obsolete and inefficient facilities, facility systems, or equipment. For example, over the last four years, over 80% of the Laboratory's GPE funds have been committed to two compliance projects, replacement of underground storage tanks and replacement of CFC chillers. To most effectively meet the future needs of ORNL programs, a substantial increase in funding will be required for future years.

Appendix I is a listing of infrastructure projects with significant ES&H drivers. All ADSs in this appendix are previously listed in the funded or unfunded appendices. Activities having significant need or impact to the Laboratory are listed separately or "rolled up" into like projects. Infrastructure funding is requested on FWP ERKCL01, *ORNL General Purpose Equipment - Landlord*; FWP ERKCL02, *ORNL General Plant Projects - Landlord*; as a Line Item request through ERKG funding; or as a separate FWP request.

#### **7.6.6.1 ES&H Infrastructure Issues Milestones**

The following are scheduled for completion by April 30, 1998:

- Issue a call to the division/office/program managers for the identification of landlord infrastructure needs. (Complete)

- Document all identified needs in the Integrated ES&H and Infrastructure Data Management System on separate ADSs.
- Prioritize all ADSs by Risk Ranking Board.
- Submit FWPs (or funding documents) to DOE requesting GPE, GPP, and Line Item (LI) funding.

## **7.7 EXECUTION OF RESOURCES**

One common method will be initiated for tracking of the execution of resources applied for ES&H remediation activities and the change control process. ORNL is currently in the process of initiating an integrated ES&H and infrastructure management planning system. Along with this integration will be a programming bridge to the PMTS. Contractor managers will be responsible for entering overhead funding requests and Field Work Proposal (FWP) requests for direct funding into the PMTS. The PMTS will provide data electronically to complete the corresponding ADS when requests are designated as either ES&H or infrastructure driven. Contractor Managers will verify information and be responsible for tracking and updating information. The system is being designed to notify the ES&H and Infrastructure Program Administrator when a new request is made, a request has been deleted, or when a request has been changed. The Administrator will verify changes with the Contractor Manager prior to changing the database. The Finance and Budget Division personnel are the only individuals who can give authorization for PMTS tasks prior to submitting information to ORNL management for resource allocations of overhead funds or for issuing an FWP to DOE.

APPENDIX A

[Oak Ridge National Laboratory Organization Charts](#)



APPENDIX B

[ESH&Q Program Office Descriptions](#)



APPENDIX C

[DOE-LMER Contract Clauses](#)



APPENDIX D

Business Strategies

[Draft ORNL R&D Strategic Plan - May 1995](#)

(Currently in Revision)



APPENDIX E

ORNL Hazards Identification,  
Facility Classification, and Facility Authorization Basis



APPENDIX F

[ORNL Performance Measures Status Report](#)



APPENDIX G

ORNL One-Line ES&H ADS Tables for FY 1997

### NOTES REGARDING ALL TABLES IN APPENDIX G

Significant changes have occurred in the FY 1997 actual budget amounts since submission of the FY 1999 ES&H Management Plan. Sections 6.2 and 6.3 of this submittal denote actual spending for FY 1997.

Planned FY 1997 ES&H budget data in Section 6 and the tables in Appendix G contain the original data submitted in the FY 1999 Budget Formulation Plan submittal. No changes were made to any cost and funding data. Sections 6.2 through 6.4 give an explanation of significant differences between what was planned and what was actual in FY 1997 cost and funding.

The ADSs listed in these one-line tables have several primary drivers identified as DOE orders that have been replaced by standards identified in the N&S process. Primary drivers will be revised in the FY 2000 Budget Formulation Plan submittal.

APPENDIX H

ORNL One-Line ES&H ADS Tables for FY 1998

[NOTE REGARDING ALL TABLES IN APPENDIX H](#)

The ADSs listed in these one-line tables have several primary drivers identified as DOE orders that have been replaced by standards identified in the N&S process. Primary drivers will be revised in the FY 2000 Budget Formulation Plan submittal.

Appendix I

ORNL One-Line ES&H/Infrastructure Driven ADS Table  
(This List Is in the Process of Being Updated for the  
FY 2000 Budget Formulation Submission)

NOTE REGARDING TABLE IN APPENDIX I

The ADSs listed in this one-line table have been identified as both ES&H and infrastructure driven and are currently being updated for the FY 2000 Budget Formulation Submission. Integration of ES&H and infrastructure ADSs occurred in October 1997; therefore, no corresponding table in the FY 1999 Budget Formulation Submission exists.